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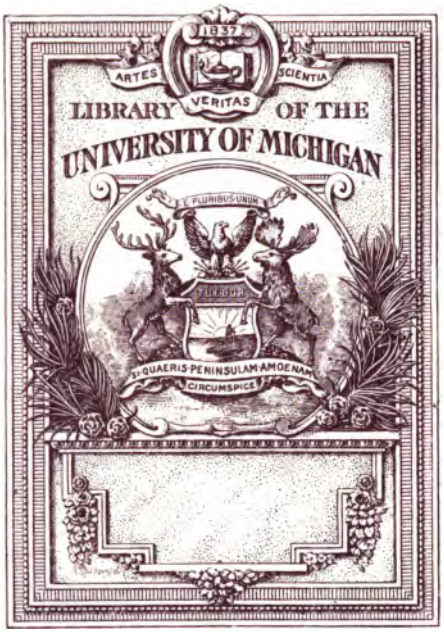

THE GIFT OF

Dr. Geo. Dock

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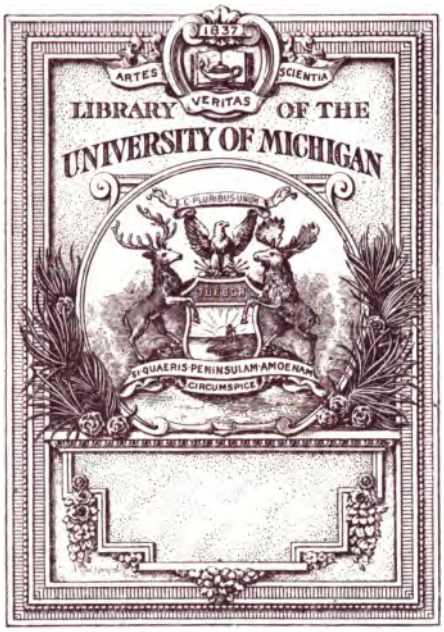

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TRANSACTIONS

OF THE

TEXAS STATE

Medical Association.

TWENTY-SEVENTH ANNUAL SESSION

HELD AT

DALLAS, TEXAS,

April 23d, 24th, 25th and 26th, 1895.

GALVESTON, TEXAS:
KNAPP BROTHERS, PRINTERS AND PUBLISHERS.
1895.

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OFFICERS FOR 1895–96.

PRESIDENT.

P. C. COLEMAN, M. D.....Colorado

FIRST VICE-PRESIDENT.

J. T. WAGLEY, M. D.....Cleburne

SECOND VICE-PRESIDENT.

N. B. KENNEDY, M. D.....Hillsboro

THIRD VICE-PRESIDENT.

T. B. BASS, M. D.....Terrell

SECRETARY.

H. A. WEST, M. D.....Galveston

TREASURER.

J. LARENDON, M. D.....Houston

JUDICIAL COUNCIL.

DR. R. RUTHERFORD, Houston.....To serve one year
DR. S. CUNNINGHAM, Bastrop.....To serve one year
DR. W. B. MCKNIGHT, Springtown.....To serve one year
DR. L. ASHTON, Dallas.....To serve one year
DR. J. H. O'Hara, Grandview.....To serve two years
DR. E. W. LINK, Palestine.....To serve two years
DR. J. C. LOGGINS, Ennis.....To serve two years
DR. J. M. INGE, Denton.....To serve two years
DR. J. W. HAMILTON, Lampasas.....To serve three years
DR. F. R. MARTIN, Kyle.....To serve three years
DR. W. H. MONDAY, Terrell.....To serve three years
DR. F. L. WHITE, Houston.....To serve three years

ORATOR.

DR. IRVIN POPE.....Tyler

SECTION ON GENERAL MEDICINE.

Dr. W. L. York, Chairman ..... Decatur
Dr. R. B. Grammar, Secretary ..... Fort Worth

SECTION ON OBSTETRICS AND DISEASES OF CHILDREN.

Dr. J. J. Williamson, Chairman ..... Cleburne
Dr. C. M. Alexander, Secretary ..... Coleman

SECTION ON SURGERY.

Dr. M. D. Knox, Chairman ..... Hillsboro
Dr. O. L. Williams, Secretary ..... Oak Cliff

SECTION ON MEDICAL JURISPRUDENCE, ETC.

Dr. T. J. Bennett, Chairman ..... Austin
Dr. Sam Cunningham, Secretary ..... Taylor

SECTION ON GYNECOLOGY.

Dr. T. J. Bell, Chairman ..... Tyler
Dr. J. S. Letcher, Secretary ..... Dallas

SECTION ON STATE MEDICINE.

Dr. R. Rutherford, Chairman ..... Houston
Dr. I. N. Suttle, Secretary ..... Corsicana

SECTION ON OPHTHALMOLOGY, ETC.

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Dr. H. L. Hilgartner, Secretary ..... Austin

SECTION ON DERMATOLOGY, ETC.

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Dr. R. W. Knox, Secretary ..... Houston

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Dr. Wm. Gammon, Secretary ..... Galveston

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Dr. H. P. Cooke ..... Galveston
Dr. David Cerna ..... Galveston

COMMITTEE ON NECROLOGY.

Dr. E. D. Capps, Chairman.....Fort Worth
Dr. W. M. Yater, Secretary.....Grand View

COMMITTEE ON STATE BOARD OF HEALTH.

Dr. J. W. McLaughlin, Chairman.....Austin

COMMITTEE OF ARRANGEMENTS.

Dr. Bacon Saunders, Chairman.....Fort Worth

TIME AND PLACE OF MEETING.

Fort Worth .....Fourth Tuesday in April, 1896

CONSTITUTION AND BY-LAWS

OF

THE TEXAS STATE MEDICAL ASSOCIATION.

CONSTITUTION.

ARTICLE I.

The name and style of this association shall be the "TEXAS STATE MEDICAL ASSOCIATION."

ARTICLE II.

The object of this association shall be to organize the regular medical profession of the state in the most efficient manner possible; to encourage a high standard of professional qualifications and ethics; to promote professional brotherhood; to labor for the advancement of state medicine, *i. e.*, of public hygiene; of medical education; of medical jurisprudence and public institutions for the sick and infirm.

ARTICLE III.

Every regularly educated physician within the limits of this state, who is a graduate of a regular medical college in good standing, and who adopts and conforms to the Code of Ethics of the American Medical Association, shall be eligible to membership in this body, except those of the negro race.

ARTICLE IV.

SECTION 1. The officers of this association shall be one president, three vice presidents, one secretary, one treasurer, nine chairmen and secretaries of sections, and twelve members of the judicial council.

SEC. 2. The president and vice presidents shall be elected for one year, the secretary and treasurer shall be elected each for five years, and every officer shall remain in office until his successor is duly elected and installed.

ARTICLE V.

SECTION 1. It shall be the duty of the president to preside at all meetings of the association, when present; to give the casting vote; to see that all the rules of order and decorum are enforced in all deliberations of the body; to sign the approved proceedings of each meeting, and to approve such orders as may be drawn upon the treasurer for expenditures ordered by the association.

SEC. 2. It shall be the duty of the first vice president to preside in the absence of the president, and in the absence of the president and first vice president the second vice president shall preside, and in the absence of the president, first and second vice presidents, the third vice president shall preside.

SEC. 3. In the absence of the president and all the vice presidents, the association shall, by ballot, elect one of its members to preside *pro tem.*

SEC. 4. It shall be the duty of the secretary to keep a true and correct record of the proceedings of each meeting; to preserve all books, papers and things belonging to the archives of the association; attest all orders drawn upon the treasurer for moneys appropriated by the association; keep a register of the members, the dates of their admission and places of residence. He shall attend all committees that may be appointed by the association, with such documents as may be necessary for reference; report such unfinished business of previous meetings as may appear on his books requiring action, and attend to such other business as the association may direct. He shall also supervise and conduct all the correspondence of the association.

SEC. 5. It shall be the duty of the treasurer to collect all moneys due the association and receipt for same, and keep the accounts of the association with its members, and pay all orders drawn on him by the president and attested by the secretary and by the chairman of the committee of publication, and make an annual report of the finances of the association, and furnish the secretary with a list of delinquent members, and, if required, give bond for the faithful performance of the duties of his office.

ARTICLE VI.

Vacancies occurring in the offices of the association shall be filled by appointment by the president, and he shall have the appointment of all the committees not otherwise provided for.

ARTICLE VII.

SECTION 1. County and district societies in affiliation with this association shall be entitled to representation at each meeting of the asso-

ciation upon this basis, to-wit, two delegates for every ten members, and one for each fraction of ten over five.

SEC. 2. Before admission to a seat in this association, each delegate shall produce a certificate of delegation duly signed by the secretary of his society, and pay to the treasurer the annual dues of $5.00 and the initiation fee of $5.00.

SEC. 3. Delegates shall have the rights and privileges of members for that meeting of the association to which they are sent.

SEC. 4. Delegates to this association from any other state or national association who shall present certificates of delegation duly signed, shall be entitled to seats and to participate in the scientific business of the association, but shall not be entitled to vote or be required to pay dues.

ARTICLE VIII.

This Constitution shall immediately take effect from its adoption.

BY-LAWS.

ARTICLE I.

The Texas State Medical Association shall meet annually, at such time and place as may be determined by the committee on nominations.

ARTICLE II.

Fifteen members, or any number over, shall constitute a quorum for business.

ARTICLE III.

The president shall call the meeting to order, cause the secretary to read the proceedings of the previous meeting, which, after approval, shall be adopted.

ARTICLE IV.

In case there be no quorum, the meeting shall adjourn from day to day until such quorum be had.

ARTICLE V.

The fee of admission shall be $5.00 United States currency, and the annual dues of each member $5.00 United States currency.

ARTICLE VI.

The usual parliamentary rules governing deliberative bodies shall govern the business workings of this association.

ARTICLE VII.

All questions of business before this association shall be determined by a majority of votes present.

ARTICLE VIII.

It shall be the duty of the president to deliver, at each annual meeting of this association, an address.

ARTICLE IX.

A committee of one member from each county represented shall constitute a committee on nominations for offices and places of meeting. Said committee shall report action one day prior to adjournment.

ARTICLE X.

The secretary of the association shall receive, as a compliment, at each annual session a draft from the president upon the treasurer for the sum of $200 for valuable services rendered the association, said order to be paid by the treasurer, and he shall also be allowed to draw upon the treasurer, as usual, for expenses incident to the office. The treasurer shall receive for his services $150.

ARTICLE XI.

It shall be the duty of the president, three months prior to each annual meeting of this association, to notify, by circular, the profession of the state and county organizations throughout the state, and, urge attendance.

ARTICLE XII.—JUDICIAL COUNCIL.

SECTION 1. A council consisting of twelve members shall be appointed by the nominating committee, whose duty it shall be to take cognizance of and decide all questions of an ethical judicial character that may arise in connection with the association.

SEC. 2. Of the twelve members of the council first appointed, the four first named on the list shall hold office for one year, the second four named shall hold office two years, and the third four named shall hold office three years, so that four new members shall be appointed each year, who shall hold office three years. The said council shall

organize by choosing a president and a secretary, and shall keep a permanent record of its proceedings.

SEC. 3. It shall be the duty of the judicial council to discipline members from infraction of the Code of Ethics, or for violation of any special order or resolution of this association, its Constitution or By-laws. Such discipline may be either (*a*) reprimand (*b*) suspension for any definite period, (*c*) expulsion from the association.

SEC. 4. Charges against a member shall be presented in writing over the signature of the accuser, with specifications as to time and place of the offense and names and residence of his witnesses, to the chairman of the judicial council, who shall submit the same to the council at its next meeting.

SEC. 5. The judicial council shall consider the charges and specifications, also the reliability of the accuser and the witnesses, and shall then, by vote decide either to "entertain" or "not entertain" said charges. In the latter case the charges shall be returned to their author with the action of the council indorsed thereon. If the council decides to entertain the charges, it shall notify the accused, furnish him with a copy of the charges, specifications and names of witnesses, also the time and place where the case will be heard. The accuser shall also be notified of the same and instructed to have his witnesses present. After a full hearing the council shall vote upon the guilt of the accused, and if guilty, assess his punishment. As soon after the trial as possible it shall be the duty of the council to report its action to the association.

SEC. 6. The association shall thereupon vote upon the report of the council by ballot, a majority deciding its adoption or rejection. The action of the association shall be final, the association claiming jurisdiction as to who shall constitute its members and what punishment shall be inflicted upon those who violate its rules and regulations.

ARTICLE XIII.—SECTIONS.

The general meeting of the association shall be restricted to the morning session, and the afternoon session shall be devoted to the hearing of reports and papers and their consideration, in the following sections:

1. Practice of Medicine, Materia Medica and Physiology.
2. Obstetrics and Diseases of Children.
3. Surgery and Anatomy.
4. Medical Jurisprudence, Chemistry and Physchology.
5. State Medicine and Public Hygiene.
6. Gynecology.
7. Ophthalmology and Otology.

8. Dermatology and Medical Botany.
9. Microscopy and Pathology.

The chairman and secretaries of the several sections shall, like other officers of the association, be nominated by the nominating committee. They shall hold their office until the close of the proper business of the annual meeting next succeeding their election and until their successors are appointed.

MINUTES

OF THE

TWENTY-SEVENTH ANNUAL MEETING

OF

The Texas State Medical Association.

DALLAS, TEXAS,

April 23d, 24th, 25th and 26th, 1895.

TEXAS STATE MEDICAL ASSOCIATION—TWENTY-SEVENTH CONVENTION.

FIRST DAY—*Morning Session.*

AUDITORIUM, CITY HALL, DALLAS, Texas, April 23, 1895.

The association was called to order at 11.30 a. m. by the president, Dr. J. W. McLaughlin.

Rev. M. M. Davis opened with prayer.

Hon. Frank P. Holland, mayor of Dallas, then delivered an address of welcome.

Dr. John O. McReynolds, chairman of the committee on arrangements, delivered the following address, representing the medical profession of Dallas:

In behalf of the medical profession of this city I extend to you a cordial welcome. I need utter no word of praise for Dallas or her generous people. Our distinguished mayor has told you in language better than mine how the gates of this fair city are thrown open in gladdest greetings to you. The lamented, immortal Grady, looking into her face, called her the greatest city of the greatest state of the grandest government on earth. And I come before you today as an unworthy representative of the most glorious brotherhood of the greatest city of the greatest state of the grandest government on earth. An association for the advancement of science is essentially good and not evil, and whatever of envy or personal strife may creep within the bounds of this society is a perversion of the proper and lofty aim of this institution. In medicine more than in any other department of scientific research do we find an imperative demand for organization; not for the purpose of protection against powerful combinations of wealth and influence; not for the purpose of securing individual emolument or honor, but that we may receive the richest

fruits of our combined experience and study, to the end that we may become more efficient and faithful servants in the vineyard of mankind. The span of human life is so short, individual experience and observation so restricted, the influence of climate and environment so varied, habits of thought and methods of investigation so widely different, and our field of labor so important and so sacred that no one can with justice to himself and those committed to his care follow alone the feeble rays of his own dimly burning lamp, when his mind might be filled with a flood of light from all the intellects of the world. By personal contact in societies we receive not only the ripened result of vast and varied experience and investigation, but an inspiration to higher attainments and more faithful service. He that would build best a monument to his memory in the hearts of his fellowmen must come to the sweet and sacred shrine of truth, around which alone do lasting laurels grow. You come, we trust, in the true spirit of your noble profession, which carries you not only in close relation to all the commercial activity of our country and in sympathy with all the progress in the vast realm of science, but it gives you an entrance into the most consecrated domain on earth, around the sacred altars of every home. Your influence touches not only that heart which beats and bleeds and must pass away, but it penetrates into the inmost recesses of that heart which is to live forever. Your duty calls you to administer with impartial hand to suffering humanity wherever found, in the splendid palaces of the rich or the humble cottage of the poor, and wealth or poverty can never disturb your responsible relation to human life. May all selfish interest be forgotten in the fervid zeal for the common good. May this association never again be darkened by the shades of disunion. May its power extend further and its prospects grow brighter as the ages roll on. Oh, long through the unknown realms of the future may it live. May it bring to your children a precious heritage of gladness and not of regret. May it cultivate and nourish the flowers of truth wherever found, and reap an abundant harvest for unfaltering fidelity, a rich fruition of its toils. And may you live to reflect honor upon the fair fame of American science and shed a new lustre on the unperishable glory of the American people.

Dr. J. W. McLaughlin responded as follows:

We thank these gentlemen, Mayor Holland and Dr. McReynolds, for the hearty welcome extended us, and assure them we will accept with pleasure the courtesies extended us.

The secretary called the roll until a quorum was found to be present.

Reading the minutes of the last meeting was, on motion, dispensed with.

The secretary then read his annual report as follows:

SECRETARY'S ANNUAL REPORT.

Mr. President and Gentlemen—I have the honor to present herewith my annual report, with which is incorporated a detailed account of publication of the transactions for 1894:

MEMBERSHIP.

There were on the roll of transactions of 1893:

Ordinary members	386
Honorary members	23
Total	409

In transactions of 1894:

Ordinary members	354
Honorary members	22
Total	376

From 409 deduct one resignation and two deaths, leaving 406.

From total membership according to roll of 1894, 376, deduct the number of members elected at Austin, which was 35, leaving 341. To this number add that of those dropped for non-payment of dues, which is 65, making a total of 406.

DEATHS.

We have lost by death since last June four members, viz: Dr. H. F. Witherspoon, of Corsicana, died September 7, 1894; Dr. M. Perl of Houston, who died of appoplexy on January 2, 1895; Dr. James Kennedy, late of Galveston, who died in San Antonio, March 27, 1895; Dr. Geo. Cupples, of San Antonio, died April 19, 1895. One honorary member, Dr. C. B. Raines, of Mineral Wells, died June 28, 1894. So far as I know, there have been no other deaths.

THE TRANSACTIONS FOR 1894.

Early in May a copy of the transactions for 1893 was submitted as a basis for bids to publishing houses in Galveston, New Orleans, St. Louis and Kansas City. The lowest and best bid by far was that of Knapp Bros., of Galveston, the publishers of the volume of the pre-

vious year. This bid was as follows: To furnish 450 copies bound in cloth, and 100 copies bound in paper, at the rate of $1.44 per page for long primer type, and $1.49 per page for brevier type.

The appearance of the manuscript to be printed suggested the probability of a volume at least equal in size to that of the year before. The balance in the treasurer's hands and the estimated revenue from collection of dues suggested a strong probability of a shortage in the amount requisite to pay the cost of publication. Here was the dilemma foreseen and mentioned in my report of last year. We were compelled to make a contract without knowing the cost, as the number of pages could not be estimated with certainty nor could the amount the treasurer would be able to collect be known in advance. We were forced to choose between two alternatives, viz: to cut out a large proportion of the matter passed upon for publication, or to accept the result of a contingent deficiency, as the publishers expressed an entire willingness to wait the convenience of the association should a balance be due them. We adopted the latter course, believing that we would have been recreant to our obligations and justly censurable had we cast aside the contributions of our members who had labored to increase the value of our proceedings, and thus to aid the upbuilding of our organization.

The details of the publishers' bill are as follows:

550 copies of transactions, 450 cloth and 100 paper, at $1.49 per page brevier, and $1.44 per page long primer		$664 44
Tabular matter and extra composition		28 44
Wrapping, addressing, printing wrappers, etc		20 00
		$712 88
Postage, cloth, 392 at 16 cents each	$62 72	
Postage, paper, 72 at 11 cents each	7 92	
		70 64
Insertion of cuts of Dr. M. M. Smith	$ 3 75	
Insertion of cuts of Drs. Randall and Cerna	14 00	
		17 75
Total		$801 27
August 31, 1894—Cash on account		622 00
Balance due		$179 27
Cost per volume	$1 34	
Cost per volume delivered	1 72	

Number of volumes delivered to members	376
Number of volumes delivered to medical journals, other associations, public libraries, etc	88
Distributed subsequently	45
Sold	1
On hand	40
Total	550

It thus appears that the volume of 1894, which is of about equal size to that of the year previous and up to the same standard as to the paper and binding, cost 20 cents less per copy. This decrease is due to the larger number printed, and to the saving effected by having 100 copies bound in paper.

THE DEFICIT.

An assessment of 50 cents per member would about cover the amount due the publishers, but I respectfully suggest that it would be best to double this amount, and let the treasurer collect the levy of $1.00 each from members present now, and from absentees as soon as possible.

I wish the association to instruct me as to the method of procedure in the event of a contingent shortage in the amount required to publish the transactions this year. If all members would pay their dues, funds would be ample to meet expenses, but judging from past experience there will be a number who will fail to meet their obligations, so the question must be answered in advance. How shall economy be exercised? The methods that occur to me are as follows:

500 copies, exclusive paper binding, saving 17 cents each	$85 00
Postage on 464 copies, saving 5 cents each	23 20
Inferior and cheaper paper, say saving	25 00
Leaving out all illustrations, saving	25 00
Total	$158 20

I did not feel authorized to adopt any of these measures last year, for the reason that the suggestion met with the disapprobation of every member with whom I conversed upon the subject. Another method of retrenchment is to reduce salaries of officers, as follows:

Publishing committee	$100 00	
Treasurer, in same proportion	30 00	
		$130 00
Add the assessment of $1.00 per member		350 00
Total		$480 00
Deduct amount due publishers, about		180 00
Balance left		$300 00

This balance, with dues from members, would furnish the required amount without involving the necessity of deterioration in the workmanship of the transactions.

Respectfully submitted,

H. A. WEST, Secretary,
and Chairman Publication Committee.

On motion of Dr. C. M. Rosser, the report was received and referred to the following committee: Drs. P. C. Coleman, Sam Burroughs and J. C. Loggins.

Treasurer Larendon then read his annual report, as follows:

TREASURER'S REPORT.

Dr. J. Larendon, treasurer, in account with the Texas State Medical Association.

RECEIPTS.

1894.		
April 21—To cash balance on hand, as per last annual report	$ 34 30	
1895.		
April 22—To cash collected from members for dues up to date	1,425 50	—$1,459 80

DISBURSEMENTS.

1894.	
April 29—By cash paid H. A. West for secretary's salary	$ 200 00
April 29—By cash paid to the publishing committee	300 00
April 29—By cash paid J. Larendon for treasurer's salary	150 00
April 29—By cash paid to stenographer for services	50 00
April 29—By cash paid by treasurer for postage	10 00
April 29—By cash paid H. A. West for stationery	28 05
May 1—By cash paid by treasurer for printing and stationery	4 50
May 27—By cash paid for franchise tax to state of Texas	10 00
July 26—By cash paid for gold medal awarded to T. T. Jackson	15 00

Brought forward	$767 55	
August 30—By cash paid Knapp Bros. for printing transactions	622 00	
1895.		
April 16—By cash paid H. A. West for announcement programs	10 00	
April 22—By cash balance on hand	60 25	$1,459 80

Respectfully submitted,

J. LARENDON, Treasurer.

Houston, Texas, April 22, 1895.

On motion, the treasurer's report was referred to the following committee: Drs. C. M. Alexander, J. T. Wilson and M. D. Knox.

President Dr. J. W. McLaughlin then read his annual message, as follows:

Fellow Members of the Texas State Medical Association—Emotions of the keenest pleasure must be felt by every physician who takes a just pride in the scientific advancement of his chosen profession, by the brilliant and beneficent discoveries, and the substantial progress, that has been made in the departments of medicine since our last meeting—a year ago.

A review of the advances in medicine, in anatomy and physiology, in biology, chemistry, therapeutics, surgery, obstetrics and gynecology and public health, that have been made within the past year, would be out of place in this message, and even the enumeration of them would occupy too much of your time, besides these subjects will, no doubt, receive full attention during our meeting from the chairmen of sections. But the magnificent progress which scientific medicine has made within the past year should do more than excite emotions of pleasure; it should reinforce our determination that the medical profession of Texas shall occupy no unenviable place in the grand march of medical progress.

MEDICAL ORGANIZATION.

That this shall be accomplished, it is necessary that we shall investigate and record our observations. Scientific truth does not grow on bushes, nor is it to be found lying by the road. On the contrary, it lies hidden, often in nature's most secret recesses, and can not be discovered except by long and patient investigation; but once discovered it should become the common property of all. Medical organization

is useful, not only as a means of disseminating medical information, but in crystalizing it by impartial but critical discussion. Besides, the obligations that physicians owe to their families, to their patients, to their profession and to the state, can best be discharged by them through medical organizations. The valuable information that can be acquired by attending medical associations and engaging in the scientific work that is done, and the medical enthusiasm that a physician receives from such intercourse with his medical peers, will surely make him a better and a safer counselor in the sick room, will increase his clientelle and thereby will increase his ability to care for his family.

A physician's obligation to his profession demands that he make known the results of his medical observations and practice. This can best be done through a medical association, where his methods and results can be passed upon by his peers. A physician's obligation to the public, as an advisor and instructor in matters of public health, will receive greater recognition when his counsel is expressed as the sentiment of organized medicine.

I respectfully suggest, therefore, that a committee of this association be selected to consider and report on the best means of increasing the membership, and thereby the usefulness of the State Medical Association.

BUSINESS METHODS.

An excellent means of increasing the membership of the association, and, at the same time, of securing papers of greater practical and scientific value for our annual meetings, and better discussions of these, is the adoption and rigid enforcement by the association of strict business methods in the conduct of its work. Time limit should be invariably called on all papers and discussions, and no member should be permitted to speak more than once to the same subject.

LEGISLATION.

A state board of health, and a law limiting the practice of medicine to those who are qualified, still rest among the urgent needs of the state government, and there is but little if any prospect that they will not continue there. As a matter of justice to the people and the medical profession, and in the interest of public health, the medical profession of the state should be heard in all medical and health matters pertaining to the state government; but this is not likely to occur until the medical profession enforce its wishes by political arguments, as other organizations do. A long and painful experience as a member of your committee on legislation, has convinced me that

appeals to the legislature based alone on patriotic and utilitarian considerations, are entirely worthless, and often results in humiliation. The only successful method of interesting many of the members is by political arguments. They have been indifferent to such memorials, and have scoffed and jeered at such appeals; therefore, until we can find means of applying political screws—an argument that many of these men greatly respect—it is believed to be useless to again ask the legislature for a state board of health, or for a suitable and just law defining what evidences of fitness the state will require of those wishing to practice medicine in her limits before a license will be issued to them.

In conclusion, I wish you a pleasant, harmonious and instructive meeting, and sincerely hope that our efforts to unify all eligible physicians of Texas into a grand state medical association, may result in success.

The president's annual message was, on motion, received and referred to the following committee: Drs. T. D. Wooten, D. R. Wallace and J. T. Wilson.

The order of general business was now dispensed with, and the Section on Practice of Medicine called.

Dr. J. W. Carhart of LaGrange, chairman, took the chair.

Dr. J. H. Frey, the secretary of this section, being absent, Dr. Jno. O. McReynolds, of Dallas, was appointed in his place.

Dr. Carhart read the address upon "General Medicine," which, on motion, was received and referred to the publishing committee.

Adjourned until 2.30 p. m.

FIRST DAY—*Evening Session.*

The association was called to order at 2.45 p. m. by President McLaughlin.

Upon call of the judicial council the following only were present: Drs. J. C. Loggins, L. Ashton and J. H. O'Hara.

The president then substituted names in the places of the ab-

sentees as follows: Drs. C. M. Alexander, M. D. Knox, S. F. King, J. T. Wilson, H. K. Leake, Bacon Saunders. As soon as the council was organized it was requested to retire to an adjoining room.

The privileges of the floor were granted to Dr. J. M. Keller, of Hot Springs, Ark., and to Prof. Douglass, of Vanderbilt University.

Dr. Carhart was called to the chair, and section business was resumed.

Dr. H. A. West, of Galveston, read a paper entitled, "The Treatment of Dysentery." Dr. L. Ashton, of Dallas, followed this with a paper upon "Dysentery."

Dr. Sam Burroughs, at Dr. West's request, then opened the discussion on the two papers just read. Dr. Burroughs was followed by Drs. J. M. Keller, of Hot Springs, Ark., W. L. York, T. J. Bell, P. S. Gilbert, and finally the discussion was closed by Dr. West, and, on motion, the two papers were received and referred to the publishing committee.

Dr. I. M. Cline, of Galveston, next read his paper, "The Climatic Causation of Disease, and the Distribution of Certain Diseases in Texas." Discussion on this paper was opened by Dr. H. A. West, who was followed by Dr. O. L. Williams and Dr. McLaughlin, and closing remarks by Dr. Cline.

The paper was, on motion, received and referred to the publishing committee.

The judicial council here made its report, recommending the election of the following members:

J. A. Lovett.....Abbott
J. W. Miller.....Hillsboro
J. W. Hamilton.....Lampasas
J. A. Jones.....Ferris
W. J. Lane.....Dallas
M. M. Edmonson.....Dallas
Thos. W. Florer.....Waxahachie
F. P. Peyton.....Dew
I. M. Cline.....Galveston
T. T. Jackson.....Iredell

G. M. Hackler.....Ennis
G. C. Head.....Grandview
R. S. Gilbert.....Oak Cliff
J. M. Cable.....Dallas

This report was, on motion, adopted.

The secretary read a paper by Dr. David Cerna, entitled, "Phenacetin as a Toxic Agent." Discussion upon which was opened by Dr. O. L. Williams, of Oak Cliff; Dr. W. R. Blailock and others. Upon motion, the paper was received and referred to the publishing committee.

Dr. J. W. Hunter, of Waco, next read his paper, entitled, "Asthma—Its Causation and Treatment, with Report of Cases." After a short discussion by Drs. Ashton, Yater, Matthews and Blailock, on motion of Dr. Yater, seconded by Dr. Matthews, this paper was rejected as being one advertising a proprietary medicine.

Dr. O. L. Williams, of Oak Cliff, next read his paper, "Faradic Electricity in the Treatment of Inflammation." After a few remarks by the author it was, on motion, received and referred to the publishing committee.

There being nothing further under the Section of Practice of Medicine, that section adjourned.

President McLaughlin then announced that one hour on the morning of Wednesday, April 24, would be devoted to memorial services.

The Section on Obstetrics and Diseases of Children was now called. Dr. A. B. Gardner, the chairman, being absent, Dr. J. S. Letcher was appointed by the president to serve in his place.

The association then adjourned until 9 o'clock the next morning.

SECOND DAY—*Morning Session.*

The association was convened by Vice-President W. L. York at 9.25 a. m.

The Section on Obstetrics and Diseases of Children was called, Dr. Letcher in the chair.

Dr. A. M. Schenk, in the absence of the chairman, read his report, which, on motion was received and referred to the publishing committee.

Dr. T. W. Shearer read his paper, "Suprapubic Puncture of the Bladder for Over-distended Cyst, Complicating Delivery." The discussion was opened by Dr. Hunter, of Waco; who was followed by Dr. Douglass of Vanderbilt University; the author closing. Upon motion, the paper was received and referred to the publishing committee.

Dr. Landon Carter Gray, of New York, was then introduced to the association by Dr. Letcher, and was extended the privileges of the floor.

Dr. A. M. Schenk then read his paper, "The Diagnosis and Treatment of Diptheria," discussion upon which was opened by Dr. Pope, who was followed by Drs. Jackson, V. P. Armstrong and Wagley, and closed by the author. Upon motion, it was received and referred to the publishing committee.

The Section on Practice of Medicine was re-opened, Dr. J. W. Carhart taking the chair.

Dr. A. G. Clopton, of Galveston, then read his paper, "The Therapeutics of Exercise."

Discussion was opened, by request, by Dr. Landon Carter Gray, of New York, who was followed by Drs. O. L. Williams, A. M. Schenk, and closed by Dr. Clopton.

Upon motion, this paper was received and referred to the publishing committee.

The judicial council here brought in its report recommending as members:

E. P. Davis ..... Houston
E. J. Neathery ..... Van Alstyne
A. T. Perkins ..... Gatesville
R. R. Walker ..... Paris
E. N. Camp ..... Lewisville
W. P. Lee ..... Cisco

They also reported favorably on the credentials of Dr. M. D. Knox, Hill County Medical Society, and Drs. R. E. Moss and F. D. Boyd, West Texas Medical Association, and recommended the election of Dr. S. H. Stout, of Dallas, as an honorary member. The report was, on motion, duly adopted.

Dr. P. C. Coleman, chairman of the committee to whom was referred the secretary's report, read the following, which, upon motion, was adopted:

J. W. McLaughlin, M.D., President Texas State Medical Association—Your committee to whom was referred the report of H. A. West, M. D., secretary Texas State Medical Association, would respectfully report as follows:

We have examined the report and find the finances of the same correct, and we are glad to report that our efficient secretary, at the suggestion of your committee, has generously consented to accept $300.00 for his services as secretary and chairman of the publishing committee, thereby saving $200.00 and we believe this reduction of expenses with the annual dues of the members, will provide ample funds for necessary expenses the ensuing year.

Respectfully,

P. C. COLEMAN, chairman;
S. R. BURROUGHS,
J. C. LOGGINS.

Dr. D. R. Wallace then read, under the Section on Practice of Medicine, his paper scheduled under Section on Medical Jurisprudence, entitled, "Theoretical Reflections Upon Increase of Mental Unsoundness in Christendom."

Discussion of this paper was opened by Dr. S. H. Stout, of Dallas, who was followed by Drs. O. L. Williams, Clopton, Schenk and Carhart, and then replied to by Dr. Wallace. A division of the house was called for as to the reference of this paper, but after some discussion *pro* and *con*, it was by a majority received and referred to the publishing committee.

The section then adjourned, and, it being 1 o'clock, the association adjourned until 2.30 p. m.

SECOND DAY—*Evening Session.*

Vice-president W. L. York called the association to order at 2.30 p. m.

MEMORIAL SERVICES.

Dr. York stated that the memorial services would now be held.

Secretary West then called the names of the deceased as follows: Dr. Michael Perl, of Houston; Dr. George Cupples, of San Antonio; Dr. H. F. Witherspoon, of Corsicana; Dr. James Kennedy, of Galveston, and Dr. C. B. Raines, of Mineral Wells.

Dr. Oliver, of Caldwell, the chairman, not being present, Dr. Carhart, of LaGrange, took the chair. He appointed the following committees to draft resolutions on the deceased members: Drs. McGhee and Miller, of Corsicana, and Dr. Loggins, on the late Dr. Witherspoon; Drs. Moss and Boyd, on the late Dr. George Cupples; Drs. Bennett, Tyner and P. C. Coleman, on the late Dr. James Kennedy; Drs. Rutherford and Larendon, on the late Dr. Perl.

Dr. Carhart addressed the association on the necessity of memorial services, and then Dr. W. L. York and Dr. H. A. West spoke in memory of Dr. George Cupples, of San Antonio. Dr. Bennett spoke in memory of Dr. Jas. Kennedy, of Galveston. Dr. Loggins spoke in memory of Dr. Witherspoon, of Corsicana. Drs. J. Larendon and Rutherford spoke in memory of Dr. Perl, of Houston.

On motion of Dr. H. A. West, the committees appointed to draft resolutions on the deceased members were given further time.

The vice-president then called the meeting to order, and the Section on Surgery was called.

Dr. A. C. Walker, chairman, and Dr. E. D. Capps, secretary, being absent, Vice-president York appointed Dr. W. P. Burts chairman, and Dr. J. D. Osborn, secretary.

Dr. P. C. Coleman, of Colorado, read a paper on "Tetanus." Discussion of this paper was opened by Dr. York, who was followed by Drs. Wooten, Blailock, Sam Burroughs, Moody, Wagley, Jackson and Cooper.

The paper was by motion received and referred to the publishing committee.

On motion, the Section on Practice of Medicine was recalled to allow Dr. Gray, of New York, to read his paper, entitled, "The Value to the General Practitioner of a Knowledge of Nervous and Mental Disease." After the reading of which a vote of thanks was tendered the author.

The judicial council reported favorably upon the following applicants for membership:

F. A. Young	Navasota
W. F. Cole	Waco
Joe Myers	Honey Grove
R. G. Powell	Lewisville
Joe D. Becton	McKinney
C. A. Shultz	Alvarado
H. W. Wandless	Dallas
W. H. Moore	Waxahachie
F. C. Todd	Fort Worth
W. M. Moore	Paris

They also recommended that Dr. D. DuPre, of Dallas, be elected an honorary member, and that Dr. J. J. Williamson, delegate from the Johnson County Medical Society was duly accredited. Upon motion, the report was adopted.

Dr. J. C. Loggins, in the absence of the author, then read a paper, "Proper Treatment of Typhoid Fever," written by Dr. B. F. Brittain. The discussion was opened by Dr. H. A. West, followed by Dr. Hamilton, and, upon motion, was received and referred to the publishing committee.

The surgical section resuming, Dr. St. Cloud Cooper then read his paper, "Establishment of Permanent Artificial Opening for the Relief of Impermeable Organic Stricture of the Urethra." Discussion was opened by Dr. Wagley, followed by Drs. Walker, Shearer, F. A. Young, King, and closed by Dr. Cooper. Upon

motion, this paper was received and referred to the publishing committee.

Dr. E. A. Jones then read his paper, "Laparotomy—Report of a Case." Discussion was opened by Dr. Blailock and closed by Dr. Jones. On motion, it was received and referred to the publishing committee.

Dr. J. T. Wagley then read his paper, "Aseptic and Antiseptic Treatment of Burns and Scalds—Report of Case." Discussion was opened by Dr. Williams, followed by Drs. Stallcup and Kennedy. On motion, it was received and referred to the publishing committee.

The association then adjourned.

THIRD DAY—*Morning Session.*

Dr. McLaughlin called the association to order at 9.30 a. m.

The Section on Surgery was immediately called, the temporary chairman, Dr. W. P. Burts, in the chair.

Dr. E. D. Capps, the secretary of this section, now being present, read a paper, "Prostratic Troubles and Their Treatment," written by Dr. J. P. Oliver, of Caldwell. The discussion was opened by Dr. Brown, of Fort Worth, followed by Drs. Saunders, W. P. Burts, F. D. Thompson, J. M. Fort, V. P. Armstrong, R. H. Chilton, J. M. Cable, J. H. Sears, O. L. Williams, A. H. Schenck, E. D. Capps and Dr. Douglass, of Tennessee. On motion, it was referred to the publishing committee.

Dr. R. H. Chilton, of Dallas, next read his paper, "Traumatism of the Eye," which was, on motion, referred to the publishing committee.

The Section on Surgery closed.

The committee appointed to draft memorial resolutions requested further time, which was granted.

Dr. T. D. Wooten, of the committee appointed to draft resolu-

tions on the death of Dr. George Cupples, submitted the following:

Whereas, The Texas State Medical Association has learned with deep regret of the death on Saturday last of our esteemed fellow and honored first president, Dr. George Cupples; and,

Whereas, It is right and fitting that this association shall take some suitable action to testify its sense of bereavement at so great a loss—a loss in which the whole medical world shares—and at the same time put on record some expression of our appreciation of his great worth as a man and a physician; therefore,

Resolved, That a committee of three be appointed to draft suitable testimonials to be spread on the minutes in the archives of the association, and published in the medical press of the country.

(Signed) T. D. WOOTEN.

Dr. T. D. Wooten, for the committee to consider the best means of increasing membership and advancing the interests of the association, read the following report:

To the President and Members of the State Medical Association of Texas—Your committee appointed, upon the recommendation of the president, to suggest means for increasing the interest in and attendance upon the meetings of this association, beg to report as follows:

In our judgment the first and fundamental requisite for reviving and extending the usefulness and efficiency of the organization, is an intelligent and practical understanding of its objects and reason for existence. The purpose of the State Medical Association is to promote scientific research and investigation in the profession, with a view to the practical application of the great principles of medical science to the daily needs of humanity and the current practice of the physician. To that end its meetings should be devoted to a terse, pertinent and vigorous discussion of recent discoveries, approved experience and well-attested facts in the domain of medicine and its allied branches. It was never intended that the time and attention of the members should be consumed in idle speculations, imaginary exploits or vapid generalizations. Neither was it contemplated that essential and fundamental principles should be reiterated and renewed at every session, and in prolix and prosy dissertations on elementary topics with which every intelligent and properly equipped doctor is presumed to be already familiar. The social pleasures of these annual meetings are incidental to these main objects, and it is safe to say that even they will be greatly enhanced by a rigid attention to the scientific aims of the organization.

Having in mind these practical purposes of the association, and believing that their accomplishment is the surest way to increase the attendance and enlist the interest of the profession of the state at large, we recommend or suggest the following methods of attaining them :

1. That no paper intended for presentation to the association, or any of its sections, should exceed a length that will permit of its being read within twenty minutes. All papers should be presented to the chairman of each section a sufficient time before the meeting of the association to permit of its examination by him and the secretary of the section, and it shall be the duty of the chairman and secretary of each section to examine all papers thus submitted, to eliminate all irrelevant, improper and useless matter therefrom, and if it exceeds the above length, to cut it down by striking out all but the most important and valuable matter, so as to bring it within the specified limit. The paper, if deemed worthy of presentation to the association, shall then be returned to its author for revision in accordance with the action of the chairman and secretary of the section, and also for the author to prepare a brief and comprehensive synopsis of its contents and purport. All papers and discussions shall be strictly scientific, and shall not involve or refer to religious or other foreign subjects of debate.

2. All papers presented to the association and its several sections shall be presented simply by reading the synopsis prepared as above suggested, and unless the association by a vote shall call for its reading in full, it shall be discussed and referred to the proper committee by its synoptical contents alone, and not by reading it to the association.

3. In the discussions of all papers, no member shall be permitted to speak more than once to the same subject, and all speeches shall be limited to five minutes in length, which may be extended to ten minutes by vote of the association.

4. The publication committee should exercise a wise but rigid discretion in the publication of papers presented to the association, whether by synopsis or in full, and should not publish any but papers of practical and permanent value to the profession. The discretion thus vested shall not be taken away from the publication committee by a vote of the house of less than four-fifths majority.

5. The membership fee for initiation should be reduced to $2.50, and the annual dues to $2.50, so as to encourage young men and newcomers to join and to retain their connection with the association. It is also believed that the expenses of publishing the transactions can be reduced, and that the salary now paid the publishing committee

can be reduced, or partly divided with the secretary, whose labors are much lessened by the stenographers.

6. The prolific and pernicious source of weakness in the association heretofore, in which it is not different from many others, has been the prevalence of self-seeking in the disposition of the principal offices of the organization. To the end that this may be effectually stopped, we recommend that all nominations for the officers of the association shall be made by a nominating committee, who shall be required to nominate no man for any office who has been or is an aspirant for it, or who has directly or indirectly solicited the same at the hands of the committee or any member of it.

7. Another source of annoyance, amounting to a positive hindrance to the success of our meetings, is the inability to hear the papers and addresses that are read before us. We suggest that whenever it is apparent that any person can not make himself heard in the delivery of a paper before the body, it shall be the duty of the president or chairman of a section then in the chair, of his own motion, or upon the suggestion of the members, to have said paper or address read in an audible and intelligent manner by the secretary, or by some member of the association competent to do so, and, if necessary, a reading clerk shall be appointed at each meeting for that purpose.

8. We recommend that the association do encourage district and county associations, as valuable adjuncts to this organization.

Respectfully submitted,

J. T. WILSON,
D. R. WALLACE,
T. D. WOOTEN, chairman.

Dr. Wooten, in explanation of the above report, in his closing remarks, said:

We, as stated, have no standing professionally with the people of our state. As a profession we are, in a large degree, outlaws, in that we afford the people no protection from the clutches of unlawful, inexperienced and incompetent practitioners. For twenty-five years we have attempted to accomplish something in the way of legislation to protect the dignity and honor of our profession and to throw around the people some safeguard against this growing and startling evil; but strange to say, every effort in this direction has been futile, and in our pleas for the interest of humanity, we have been met with and insulted by the cry of class legislation and the base accusation of selfish motives. There are forty odd states in this Union, and each has more or less stringent laws regulating the practice of medicine; but I am ashamed

to say, Texas has worse than no law at all. The knowledge of this fact has spread abroad; yearly we are overrun by Goths and Vandals of every description. Texas is thus made the dumping ground, the rendezvous of fugitive and unqualified men in our profession, and the innocent people of Texas are made to suffer. Repeated attempts have been made toward establishing a state board of health, but likewise we have failed signally. In the light of these facts and overshadowed by this burning shame, the ardor and spirits of all high-minded and educated men in the profession have become in some measure subdued. The state has established a medical school with a three years' graded course of instruction necessary for obtaining a diploma, yet at the same time it affords no protection to the school. With the knowledge of the fact that both time and thorough training are required of them at home, many of our young men seek out short termed and inferior medical schools in other states, and often after one course of lectures may return and are let loose upon the suffering community. Only last session in our medical school, we are told, that two of the students failing in the requirements necessary to pass them into the second year, became dissatisfied and left the school, only to appear soon after before an examining board and receive a license. In the name of reason and humanity, should this state of things exist? It behooves us all to take some active steps toward putting a stop to this evil. It can be done if the doctors will only co-operate in the matter. I know of no more opportune time than now to start the reformation, and I sincerely hope this association will not adjourn without appointing a committee on medical legislation authorized to take such steps as are necessary toward securing the passage of a law which will protect the people, and thereby elevate the character and inspire new life and enthusiasm into our profession.

Our existing laws of quarantine are insufficient in that they do not meet the demands growing out of an increasing population, and furnish protection only against those rarer forms of infectious diseases. We spend annually thousands of dollars to prevent yellow fever, smallpox and cholera from entering our borders, while our cities, towns and country are suffering from epidemics of far more frequent and almost as fatal diseases, and which by scientific investigation and research and the instruction of the people in the necessary laws of hygiene and health, could in a great measure be prevented. The respective department of the federal government is willing to take entire control of the quarantine service in the several states without there being any necessary usurpation of state rights, and I for one am in favor of such a change. It is but proper that the medical association of this state should give an expression of its views on a question

so closely identified with itself, and of such vital importance to the health and happiness of the people.

Dr. H. A. West, of Galveston, addressing himself to the report brought in by Dr. Wooten, said:

On the question of the adoption of this report I wish to say a few words and to endorse, almost without exception, every position taken by the committee. Some action of the kind suggested is exceedingly important and timely, as it must have been obvious to us all that there is something radically wrong in the method of our organization, that it does not more extensively represent the medical profession of this great state.

Now the question arises as to what are the influences which operate to prevent the accomplishment of the objects sought by the association. There was one suggestion mentioned by Dr. Wooten, and to that I desire to call special attention, as in my opinion it is one of supreme importance. I refer to the total separation from the state association of all county and district organizations. As it now is they have no immunities, rights or privileges, and their sending their delegates here is a farce. I do not think we should exact from them any higher requirements than those required by the American Medical Association. I have certificates on my desk by which members of this body can be elected to the American Medical Association by the simple signature of the president and secretary of this society upon the payment of $5.00. In my opinion we should adopt some such method. I believe when a member presents a certificate, signed by the president or secretary of a county or district organization, that should be his admission card to this body, and that he should not be required to pay the initiation fee; the result of which I believe would be a large gain in membership, and an increased organization of county societies. I argued in favor of this at Galveston, but my proposition was not sustained. Now to emphasize my ideas on this subject, I will read a circular which was sent out by the secretary of the American Medical Association, urging action of this kind:

"Whereas, This association has long recognized the advantages to be derived from the more intimate relation between the state medical societies and the American Medical Association; it is hereby

"Resolved, That we request the various state medical societies to perfect their local organizations, so as to include as far as possible, in the membership of their district societies every regular practitioner within the state;

"That these local societies shall actively co-operate in urging a general attendance upon the annual meetings of the state societies;

"That the date of the same be so fixed that it shall not interfere with the attendance of those members who are delegates and members of the American Medical Association; in order that a general unification of the interests of the medical profession be promoted, and the American Medical Association become in a yet higher degree the exponent of the profession.

"That we also request the state societies to unite in establishing a uniform standard of professional requirement for admission to the practice of medicine, and to aid, as far as possible, in advancing the scientific status of the same by the appointment of state examining boards, independent of the teaching faculties of the medical colleges. To this end we further direct that the permanent secretary of the American Medical Association enter into correspondence with the secretaries of the several state medical societies, and furnish annually a written report of the membership of the state societies and the working effectiveness of their organizations."

As regards the methods of nominating officers and the evils which have grown out of our present plan, I believe they could be largely corrected by forming the nominating committee from the delegates of county and district societies upon the basis of numerical strength. As the committee is now constituted, a member from a county having one delegate has the same power as one having twenty. Such a change would also foster the growth of county societies, and increase their delegations. The time has come also in my opinion when we should restrict applicants to the state society to members of subordinate and affiliating organizations. I shall not stop to argue this point or explain my change of views, but will simply state that our scheme of organization will be essentially incomplete until we adopt this innovation.

There is another matter of great importance, in my opinion, that is, the necessity of some method of procedure by which our scientific work can be made more pointed and effective. At present the titles of papers are received so late that it is difficult to get out a program sufficiently ahead of time for members to be notified in regard to the particular papers to be discussed. I would suggest such a course as the appointment of a committee consisting say of the vice-presidents and the chairmen of certain sections, who could meet before adjournment at each session and indicate some special subject for discussion, say in general medicine, surgery, gynecology, and select certain gentlemen to open the discussion on such subjects as may be selected. I have attempted to carry this idea out, but so far without success.

If such a plan be considered and outlined beforehand by a competent committee, something could be accomplished in this line which

would add to the interest and give greater effectiveness to our proceedings.

Dr. J. T. Wilson then offered the following:

Resolved, That a committee of five be appointed to take into consideration the recommendation of the president in his message on the best means of increasing the membership and thereby the usefulness of the State Medical Association. Also to take into consideration the legislation required in regard to the medical matters, and devise ways and means by which the end sought may be reached.

This resolution was adopted, and the following committee appointed by the president: Drs. J. T. Wilson, J. F. Y. Paine, M. D. Knox, Bacon Saunders, T. D. Wooten.

The secretary announced the resignation of Dr. W. H. Baldinger, of Galveston, and Dr. William Caston, of Corsicana. On motion, these resignations were accepted.

Superintendent Long, of Dallas public schools, was introduced to the association, and invited all or any of the members to visit the city schools, especially the high school. Invitations were extended to members of the association and visitors to attend various receptions to be given that evening.

The Section on Gynecology was called up. The chairman being absent, the president appointed Dr. J. T. Wilson, of Sherman, to act in his place.

The motion was made and carried that in the reading of papers preference should be given to the authors who were present, other articles appearing upon the program to be read by caption.

Dr. S. B. Kirkpatrick, of Commerce, read his paper, "Hæmatocele—Report of a Case." The discussion was opened by Dr. Thompson, of Fort Worth, who was followed by Drs. Douglass, Walker, Saunders and J. E. Thompson. On motion, the paper was received and referred to the publishing committee.

Dr. J. W. Carhart, of LaGrange, then read his paper, entitled, "Vicarious Menstruation from the Bladder," as a substitute for that announced in the program.

The secretary read by caption a number of papers, the authors of which were absent, which, on motion, were referred to the publishing committee.

Adjourned until 2.30 p. m.

THIRD DAY—*Evening Session.*

Called to order at 2.30 p. m. by the president, who then appointed Drs. T. D. Wooten, F. Herff and Paschal as a committee to draft suitable resolutions on the death of Dr. Geo. Cupples.

The nominating committee was elected as follows: Drs. R. B. Grammar, Tarrant county; B. H. Vaughn, Hill; S. P. Rice, Falls; St. Cloud Cooper, Marion; J. W. Carhart, Fayette; Z. T. Bundy, Ellis; H. C. Frie, Montague; W. P. Alexander, Johnson; A. G. Clopton, Galveston; A. H. Schenck, Austin; J. W. Largent, Collin; W. R. Blailock, McLennan; C. O. Matthews, Kaufman; W. B. Newland, Coryell; W. L. York, Wise; W. M. Terrell, Young; D. F. Kirkpatrick, Denton; T. J. Bell, Smith; T. W. Shearer, Chambers; R. Rutherford, Harris; C. M. Alexander, Coleman; T. T. Jackson, Bosque; J. A. McGhee, Navarro; F. S. King, Grayson; R. R. Walker, Lamar; R. E. Moody, Nolan; R. G. Powell, Callahan; W. H. Moore, Goliad; T. J. Bennett, Travis; J. T. Benbrook, Rockwall; E. L. Menefee, Hood; J. H. McDaniel, Leon; W. P. White, Rusk; J. W. Hamilton, Lampasas; Daniel Parker, Robertson; F. E. Haynes, Taylor, and J. H. Blackburn, Palo Pinto.

This committee at once retired and went into executive session in the city council chamber.

In the auditorium the Section on Gynecology continued their work. Discussion on Dr. Carhart's paper was opened by Dr. O. L. Williams, of Oak Cliff, and continued by Dr. Landon Carter Gray, of New York; Drs. Wagley, Florer and Brown, of Fort Worth.

Dr. J. T. Wilson, of Sherman, then read his paper on "Menstrual Disorders in School Girls."

Dr. Landon Carter Gray opened the discussion, and was followed by Dr. Richard Douglass, both speakers complimenting the paper and fully elucidating the subject.

The chairman of this section, Dr. J. E. Gilchreest, of Gaines-

ville, then read his report, which was, on motion, received and referred to the publishing committee.

The secretary then read by caption the paper of Dr. J. B. S. Holmes, of Atlanta, "Report of a Few Surgical Cases, with Remarks on Practical Points." It was, on motion, referred to the publishing committee.

The Section on Ophthalmology was next called, Dr. R. E. Moss, chairman, and Dr. W. M. Yater, secretary, both present.

Dr. Moss, read his report. Dr. J. O. McReynolds, of Dallas, read the paper of Dr. Ed J. Birmingham, New York, entitled, "Rhinological Dont's; or What Not to Do in Nasal Affections." It was, on motion, referred to the publishing committee.

Dr. McReynolds then read his paper on "The Relative Importance of Various Affections in the Promotion of Impaired Vision." It was, on motion, referred to the publishing committee.

Dr. H. L. Hilgartner, of Austin, read his paper on "Sympathetic Ophthalmia," which was, on motion, referred to the publishing committee.

Dr. Frank D. Boyd read his paper on "The Care and Preservation of the Eyes." It was also, on motion, referred to the publishing committee; Dr. Chilton discussing it and indorsing the views of the author.

The nominating committee's report was here presented by Dr. E. L. Menefee. It was as follows:

President—Dr. P. C. Coleman, of Cleburne.
First Vice-President—Dr. J. T. Wagley.
Second Vice-President—Dr. N. B. Kennedy, of Hillsboro.
Third Vice-President—Dr. T. B. Bass, of Terrell.
Secretary—Dr. H. A. West, of Galveston.
Treasurer—Dr. J. Larendon, of Houston.
Orator—Dr. Irvin Pope.

OFFICERS OF SECTIONS.

Section on Practice of Medicine—Dr. W. L. York, of Decatur, chairman; Dr. R. B. Grammar, of Fort Worth, secretary.

Section on Obstetrics and Diseases of Children—Dr. J. J. Williamson, of Cleburne, chairman; Dr. C. M. Alexander, of Coleman, secretary.

Section on Surgery—Dr. M. D. Knox, of Hillsboro, chairman; Dr. O. L. Williams, of Oak Cliff, secretary.

Section on Medical Jurisprudence, etc.—Dr. J. T. Bennett, of Austin, chairman; Dr. Sam Cunningham, of Taylor, secretary.

Section on Gynecology—Dr. T. J. Bell, of Tyler, chairman; Dr. J. S. Letcher, of Dallas, secretary.

Section on State Medicine—Dr. R. Rutherford, of Houston, chairman; Dr. I. N. Suttle, of Corsicana, secretary.

Section on Ophthalmology and Otology—Dr. John O. McReynolds, of Dallas, chairman; Dr. H. L. Hilgartner, of Austin, secretary.

Section on Dermatology—Dr. Geo. B. Lee, of Galveston, chairman; Dr. R. W. Knox, of Houston, secretary.

Section on Microscopy and Pathology—Dr. J. E. Brown, of McGregor, chairman; Dr. Wm. Gammon, of Galveston, secretary.

Committee on Necrology—Dr. E. D. Capps, of Fort Worth, chairman; Dr. W. M. Yater, of Grandview, secretary.

State Board of Health—Dr. J. W. McLaughlin, of Austin, chairman.

Publishing Committee—Dr. H. A. West, of Galveston, chairman; Drs. David Cerna and H. P. Cooke.

Committee of Arrangements—Dr. Bacon Saunders, of Fort Worth, chairman.

Judicial Council—Drs. J. W. Hamilton, Lampasas; F. R. Martin, Kyle; W. H. Monday, Terrell, and F. S. White, Houston.

Place of meeting, Fort Worth, fourth Tuesday in April, 1896.

The report was adopted.

The secretary announced that the committee had failed to nominate the secretaries of the sections. On motion, it was ordered that the secretaries be elected at Friday's session.

Dr. Wilson, of Sherman, said that the twenty-seventh Texas

State Medical Association could not afford to pass over and not be represented at the meeting of the American Medical Association. He moved that the delegates be nominated.

Dr. West said that it had been the usual practice to nominate delegates from among those who announced that they were going to attend the meeting at the close of the meeting.

Dr. R. H. Chilton then read his paper, "Otitis Media—Report of Cases."

Dr. W. T. Cole then read his paper, "Otitis Media."

Discussion on both papers was opened by Dr. F. D. Boyd, who was followed by Drs. J. O. McReynolds, J. M. Cable and Moss.

On motion both papers were referred to the publishing committee.

The secretary read by caption a paper, "Ophthalmia Neonatorum, and Some Suggestions in Regard to Legislation," by W. P. Davis, M. D., Houston.

The session adjourned at 6.30 p. m. until 10 a. m. the following day.

FOURTH DAY—*Morning Session.*

President McLaughlin called the meeting to order at 10 a. m.

The judicial council recommended as honorary members Dr. Landon Carter Gray, of New York, and Dr. Richard Douglass, of Nashville, Tenn. Report adopted.

The installation of officers being next in order, the president appointed Drs. Rosser and Clopton as a committee to conduct to the chair the new president-elect, P. C. Coleman.

Dr. Clopton said:

It is with great pleasure I present to you the incoming president. He was elected by the unanimous vote of the nominating committee, by acclamation, without an opponent. I will say that no man is more worthy of this high position than he. His reputation as a physician

extends throughout the state, and we know he holds in high regard the scientific efficiency of our organization. Justice will never tremble for her safety at his hands.

Dr. Coleman then addressed the audience, saying:

We have heard that "some men are born great, some achieve greatness, and some have greatness thrust upon them. I am before you on this auspicious occasion a conspicuous example of this last class. Now, I realize you could select many members who would have reflected greater credit upon you and upon themselves than I am able to do, but when it comes to a loyalty to this association—I will use stronger language—when it comes to a question of love for the Texas State Medical Association, I yield to no man. It has been said that when you elect a man president you destroy his usefulness. While this is true in many instances, in most it is not. You will allow me to say that when my term as your president has expired by the side of Drs. Brown, Beckton, Clopton, Paine, Swearingen, Burts, Osborn, the venerable Sears and the distinguished gentleman who has just retired, I will take my stand and labor all I can for the good of the association, and the promotion of scientific medicine in Texas. There is a debt of gratitude the association owes the nominating committee for the care and wisdom exercised in the selection of chairmen of the respective sections. I know these gentlemen personally, and one year from now they will be on hand with their reports, and they will have good ones. Thanking you profoundly for the distinguished honor, and pledging you my fidelity to the trust, let us to work with a zeal we have never known, and with a determination that this shall be the most important year in the history of the association. There is no reason why it should not be. There was a time when it seemed that the old ship would be engulfed in the billows of dissension, but not so now. Far beyond the breakers in her majestic grandeur she is sailing on the mighty ocean of scientific truth without one ripple to disturb her motion. Again I thank you for the honor.

Dr. John O. McReynolds, of Dallas, and Dr. R. E. Moss were appointed to conduct the new vice-president to the chair.

Dr. McReynolds said:

I take pleasure in introducing to you the newly elected vice-president, who will speak to you in language better than I can.

Upon taking the stand Dr. J. T. Wagley, of Cleburne, the first vice-president, said:

I have just climbed three stairways, and am not in much of a condition to talk. I am not gifted with oratory, neither am I accustomed to speaking in public, but I want to say that this is the proudest moment of my life, to be thus elevated to the vice-presidency of this body. I graduated in the practice of medicine a little over twenty years ago, and while my name is not linked with any extraordinary feats in medicine or surgery, I still have one record I am proud of, and that is, in all that time I have never knowingly done one unprofessional act. According to my ability I will work for the good and welfare of the state medical association. Gentlemen, from the bottom of my heart I thank you for this position.

The second vice-president not being present, Dr. C. M. Rosser and Dr. E. A. Jones were appointed to conduct the third vice-president to his chair.

Dr. Rosser said:

It becomes to me a very pleasing duty to introduce to you the third vice-president. I want to say in his behalf that having observed him carefully, having had the opportunity to do so, I am able to say you have made no mistake in his selection, either in point of his qualifications as a medical man or as a gentleman. I want to encourage you to believe that while he has been some time inside the walls where many men stay who do not think as well as men on the outside, that as he carries the keys you need have no fear that this audience, or that which is to meet one year from now, may suppose he is an escaped inmate of that institution. Dr. Bass being an assistant superintendent of the North Texas Insane Asylum, has demonstrated his abilities there.

Upon taking the stand Dr. J. D. Bass, the new third vice-president, said:

I thank you very much for the honor you have conferred upon me in selecting me third vice-president. I assure you I will put forth every effort in my power to make our next meeting a success. I hope to meet you all there and also trust that the meeting will be as profitable and pleasant to you as this one has been to me.

Dr. McLaughlin then said:

In retiring from the high place that you in your kindness and generosity gave me a year ago, I wish to thank you for the honor then conferred, as well as for your courtesy and forbearance. I wish to congratulate you upon the wisdom displayed in selecting my successor,

and bespeak for him the same kindness and consideration you have shown to me.

President Coleman then took the gavel and called the meeting to order.

Dr. H. A. West, of Galveston, said:

Before we resume the section work I wish to offer a resolution in behalf of the state medical association to extend our hearty thanks to the citizens of Dallas, to the Dallas-Galveston *News*, to the local press, to the railroads, and especially to the medical profession of the city and the committee of arrangements. You do not know, nor do I know, the difficulties they have had to contend with, but having some slight conception of the same, I wish to voice our appreciation of the work they have accomplished in making this one of the most successful and interesting sessions we have ever held. I think we are to be congratulated upon the spirit of harmony which has prevailed here. While the attendance has not been large, the spirit of fraternity and the signs of progress and development are delightful to contemplate. It takes no prophet's tongue to foretell the day when our beloved association shall take its place in the foremost rank. What I say is from the bottom of my heart, especially in reference to the committee of arrangements and the people of this city, who have so kindly, nobly and generously contributed to the success of this meeting.

This resolution was then adopted with applause.

Dr. H. A. West then suggested that as some of the members of the judicial council had departed for home and important business remained unattended to, the president appoint substitutes.

President Coleman then appointed as pro tem members of the judicial council the following: C. M. Rosser, E. A. Jones, J. T. Wagley, J. W. Hunter, R. E. Moss, T. W. Shearer, and J. M. Inge.

The judicial council brought in a report recommending for election Thos. G. Duncan, of Victoria. Upon motion, adopted.

The section on Pathology was next called, and the chairman being absent, Dr. J. O. McReynolds was appointed by the president to act as chairman. Under this section Dr. Wm. Gammon read his paper, "The Antitoxine of Diphtheria in Practice;

Reports of Several Cases." This was discussed by Dr. McLaughlin, who, upon motion of Dr. West, was requested to write an additional discussion on the subject upon his arrival at home. The request in the shape of a motion was carried.

Dr. DuPre then made a few remarks on the subject of immunity from disease, stating that his observation had been that some people were naturally exempt even from contagious diseases.

The section then closed.

The section on state medicine was then called and Dr. Rutherford, the chairman, being absent, Dr. C. M. Rosser was appointed in his place.

Dr. J. O. McReynolds then read his paper, "Ophthalmia Neonatorum."

Dr. McLaughlin commenting favorably on the paper, said he thought there ought to be a state board of health, whose duty it should be to look after this subject and others of like import, and the hygiene of the people in general.

Dr. Rosser likewise commented favorably on the suggestion contained in Dr. McReynold's paper, and among others suggested the idea that an effort be made to bring the matter up before the next legislature and have favorable action taken thereon.

Dr. McReynolds wound up his discussion by stating that he intended to exert his every effort to have the Dallas city council take immediate action, as it was a subject of great importance to all, and he suggested that all members should endeavor to have the municipal bodies in their respective localities take a like action; and thus by bringing the matter more directly from other than a professional body, and from the representatives of the people at large, the proper steps could be taken to bring the matter before the state officials for favorable action.

Dr. Cable, of Dallas also spoke on the necessity of legislation on this particular line, stating that a case had come under his experience where the patient had been attended by a colored

midwife. He believed that this could be avoided if proper steps were taken.

Dr. Wagley indorsed all that had been said, and reported two cases under his observation, one of total blindness. He said he thought it would be true economy on the part of the state to enact such a law as was recommended by Dr. McReynolds, as in cases of blindness the state had to burden itself with the sustenance of the blind persons anyhow.

The Section on Dermatology was then taken up, and Dr. Williams, of Dallas, was appointed to preside in the absence of the chairman.

There were no papers and no report from the chairman. Dr. West emphasized the remarks made by the president with regard to the proper section work; that he wanted the minutes to show that the officers appointed on this section had failed to come forward with any papers or report. The section then closed.

Dr. H. A. West then spoke with reference to failure of county and district organizations to report. He said:

I requested reports from all county and district societies in the state in affiliation with this body, in order that the roll of such organizations as appearing in the transactions should be corrected and made accurate. I have no doubt that a great many of these societies which now appear on the roll are defunct. This matter has been especially called to my attention by the secretary of the American Medical Association in the circular read yesterday, and again by the evident necessity of more thorough affiliation between such societies and the State Medical Association. I have no means of communicating with the defunct organizations, not knowing whom to address, and I make this mention of it now in order that the reporter of the *News* may through his paper call the attention of all physicians by this publication, so that they may communicate with me. I want them to give me the name of every county and district organization in the state, and those who know of any organization having been in existence, but now defunct, to give me such information, in order that our record may be complete and exact. So far I have received communications from but five of such organizations.

President Coleman then appointed as delegates to the American Medical Association Dr. J. M. Scott and Dr. J. M. Cable, the latter from Dallas.

Dr. O. L. Williams, of Dallas, spoke at length on the lack of interest and small attendance at the meetings. He regarded the social features attendant upon the sessions as detrimental. He said these entertainments and banquets should be discontinued and no such festivities engaged in until the last evening or that following adjournment. He said that members would attend these banquets and receptions and lose all interest in the proceedings, and when important papers, prepared with great care by the authors, were read, often on account of a previous night's enjoyment at the socials, but few members would be present to listen. He wished these things discouraged, and wanted members to get down to strict business. He also said these things were costly, although the Dallas contributors made their donation cheerfully. These events, he said, had helped to disintegrate the membership, and this had been commented upon by reputable Dallas physicians, some of whom did not join hands with the association on that account. Some of them had lost all respect for the association, and some had said it was run in the interest of a class of specialists to a degree that was harmful.

Dr. McLaughlin informed Dr. Williams that these matters had been referred to in the committee report on the best method to increase membership, and due consideration would be given such matters by them. He suggested that Dr. Williams correspond with that committee.

President Coleman said: "Dr. Williams, you tell those gentlemen who are criticising the association to come and help us out."

Dr. Wagley concurred with the suggestions of Dr. Williams, and suggested that no social festivities be indulged in until the evening after the close of the last day.

The minutes of this session were then adopted without read-

ing, and the association adjourned to meet at Fort Worth on the fourth Tuesday in April, 1896.

[Signed] P. C. COLEMAN,
President.

H. A. WEST,
Secretary.

PRESIDENT'S ANNUAL ADDRESS.

THEORETICAL REFLECTIONS UPON THE MANIFESTATIONS AND MODUS OPERANDI OF DRUG ACTION UPON THE LIVING ORGANISM.

J. W. McLAUGHLIN, M. D.,

AUSTIN.

Because it has been the custom of this association, since its organization, to require an address on some subject relating to medicine—its achievements, history, traditions or relations to society—I am before you tonight to discharge this duty of the retiring president.

It would seem, at first glance, not difficult to select a theme from the above mentioned subjects, but in examining the question closer, and in view of the fact that such an address must entertain not only physicians, but also laymen, I find that first impressions in this case, as in most others, are untrustworthy, and as you approach the subject difficulties that were not seen from a distance, become apparent.

One of the many difficulties that beset our path in choosing a subject for such an address, is, that in order to entertain or instruct physicians, one must either bring forward new matter for thought or present old ideas in a clearer or better manner than they had previously been presented; while, on account of the lack of interest taken by non-technical persons in the dry details of medical work, it will be seen that part of our audience would not be entertained by that character of discus-

sion, involving technical work and language that medical men expect in a medical paper.

The history of medicine, it is true, is always an interesting and fruitful field that will furnish entertainment and instruction for all. In glancing over some of the addresses of my predecessors I find, however, that this field has been drawn upon more than once, and the history of our science has been followed from the ancient, through medieval, to modern times; or, from what might be called the embryonic period of medicine, where faith and superstition, in the absence of knowledge, were its guiding principles, down through the centuries, pointing out, here and there, epochs that mark some grand discovery, following its evolution as medicine grew more and more exact as a science, and more and more perfect as an art, until today its achievements in surgery, obstetrics, gynecology, bacteriology, physiology, etc., challenge the admiration and wonder of the world. Therefore, unless I could treat the history of medicine more forcibly or more fully than my predecessors have done, my attempt would be a failure; and, as I can not hope to do this, my subject must come from some other field.

The history of the past theories that have marked the progress of medicine would furnish an adequate background for an interesting story, which would both instruct and amuse. Many of these theories, in fact, most of them, are known only as tombstones which mark the graves of buried hopes, or as finger posts which tell the traveler the road of medical progress, while not a few of them are to be regarded as pathological curiosities. In either case, however, they have served a purpose, and when they ceased to be useful, they have been retired, while younger favorites, more in accord with the thought and customs of the time, have been used and in their turn have gone to join their older brothers. But let us not think of the sad fate of these noble theories, but "let the dead past bury its dead," and direct our attention to the present.

In view of the fate that has overtaken so many theories of medicine, it may seem strange to you that I have selected a

new theory as the subject of this address. In doing this, I can only say in excuse that there are times in men's lives when they are impelled to do things of which their judgment does not always approve, and I am of the opinion that this is the proper time and occasion to present certain views by means of which I explain the intimate nature of drug energy, the cause of the different manifestations of this energy, and the means by which drugs affect the living organism. This theory has, for several years, occupied much of my thought, and the more I consider it the more I become convinced that it contains important truths and valuable suggestions. Accordingly I feel impelled to submit it to your consideration and your scrutiny. Moreover, the dynamics of drugs will possibly interest our visitors also, since they, at times, have to undergo the ordeal of taking medicine, and would therefore be entertained by learning its mode of action. I do not claim more for this theory than that it offers a rational explanation of drug action; and I fully realize that, sooner or later, it may go to join the departed or may be summarily delegated to the limbo of the unknown, unsung and unhonored. However, I trust that it will not meet such a fate, and that it may, at least, serve as a finger-post that will point towards the road along which progressive medicine must advance. To the present time there has been no attempt to unravel the deep mystery which surrounds the subject of drug action, even by means of a rational theory. Do not understand me to say that there is no knowledge of the therapeutic properties of drugs; on the contrary the innumerable volumes of materia medica and therapeutics testify to the vast amount of knowledge that has been obtained by means of observation and experiment. It must be admitted, however, that the knowledge of therapeutics heretofore acquired has been gleaned by means of empirical methods, which give us no information whatever concerning how drugs accomplish results. The rational drug action will be discussed tonight, and when I say that nothing is known of this, I merely state the truth.

Our homœopathic neighbors, it is true, have a theory of drug

action that dates from Hahnemann, the founder of the school. This theory is, however, too idealistic and too unscientific to receive more than a passing consideration in this materialistic and scientific age. Hahnemann advanced this theory in order to explain and support his theory that the activity of drugs is inversely proportional to their mass, and not as an explanation of drug dynamics; still, there are some persons who offer it as an explanation of therapeutic action. For fear that some are not familiar with Hahnemann's theory, I give a brief epitome, as follows: Drugs have a spirit combined with the matter of their substance. Succussion and trituration of a drug increases its therapeutic energy in so much as it liberates the spirit from its materialistic bondage, and consequently the spirit, which is rendered somewhat nascent, acts more readily and more powerfully on the like spirit of man. Aside from this I know of no other theory offered to explain drug energy and the manner in which this energy accomplishes its therapeutic effects. Therefore I trust that this paper will not be considered out of place tonight.

I need hardly remind you that the transition between what we call theory and what we term fact, is gradual; that much of that regarded by us as fact is only fact in thought; observation alone is certain—observation pure and simple. Interpretation of observation introduces uncertainty in proportion to the extent of the inference. Sometimes we do not perceive the existence of inference; more often we do not realize its extent. There is is a region below the surface from which no reflected light can pass and where all observed phenomena arise; here hypothesis is absolute. In this region we must either accept indirect perception, or be content with no knowledge of the causes of observed phenomena. Where we have no certainty we must either be content with probability or relinquish all attempts to know. Knowledge cannot be limited to the certainty of actual observation. Pure hypothesis, if it enables us to better discuss that which is in sight to discover more of its details, to see its relations more clearly, to grasp its character more firmly, affords

us too much help to be despised. Where theory does not outgrow the facts which it tends to explain, but when it enables us to better understand the intimate causes of the phenomena —their relations to each other and to the subject of which they are phenomena—then theory is as necessary for an understanding of the subject as are the facts. Theory is the woof that holds together and gives form and continuity to the warp of facts; theory is worthless without facts; without theory facts are unintelligible.

I do not hesitate, in view of these considerations, to ask your attention tonight, and if you will pardon me for the request, your close attention, to an elucidation of a theory of the dynamic and therapeutic energy of drugs. Although I must acknowledge this theory is largely speculative, as it must necessarily be in the absence of definite knowledge concerning its fundamental principles, it is not unscientific, but on the contrary, rests on those laws of motion in matter which, science says, control the universe.

The physical universe, so far as can be determined by the most exact and correct scientific aids, is composed of matter, motion and ether. The matter of the universe, or at least that portion of it investigated by man, has been resolved into seventy-three elements, which are primary in so far that they have resisted every effort that has been made to resolve them into more simple bodies.

When these elements are reduced to their ultimate parts, beyond which they have never yet been divided, they are converted into atoms. An atom, therefore, is the smallest possible division of an element; and since there are seventy-three different elements, there are seventy-three species of atoms. Since these atoms compose the whole of the material universe, you will agree with me that they are very important bodies; and when I inform you that a description of them and their properties, even though it be an imperfect one, will occupy a large part of this address, I feel assured of your close attention. This is especially desired—in fact it is necessary—in order that

you may understandingly follow the argument, based upon these principles of motion in matter, which I intend to elucidate. Doubtless you have already anticipated it is in the properties of atoms and molecules that we seek those activities that give drugs their therapeutic power. Whether or not an atom is ultimate, does not concern our inquiry. That atoms have never been divided, that they behave as ultimate parts, that they have measurable magnitudes, that they have definite known weights, and that they combine with each other in definite proportions, these facts warrant our saying that, even if they are not ultimate, their parts are so closely connected that, for our purpose, atoms are ultimate. Faraday says that "an atom of oxygen is ever an atom of oxygen; nothing in the least can wear it; if it enter into combination and disappear as oxygen; if it pass through a thousand combinations, animal, vegetable and mineral; if it lie hid for a thousand years and then be evolved, it is oxygen with its first qualities, neither more nor less. It has all its original force, and only that; the amount of force which it disengages when hiding itself has again to be employed in a reverse direction, when it is set at liberty.

The form of atoms has not definitely been determined; but since the conception that they are vortex rings offers a more adequate explanation of their wonderful qualities, many physicists believe this to be true. But whatever be the form of atoms, we all admit that they are elastic bodies, which rebound from one another after a collision, as does a rubber ball; and it is also admitted that they are magnetic bodies, and consequently possess a positive and negative pole. The motion of atoms can be resolved into an interior motion, and a motion of translation; the former results from a change of the form of the atom, and bears a definite relation to its weight, mass and form, and is determined by the atomic heat, measured from absolute zero; while the latter, sometimes called the free-path motion of atoms, results from atomic collisions, and bears a definite relation to the frequency of these impacts and to the density of the substance. Heat increases the frequency of

atomic and molecular collisions, thereby increasing the intermolecular and interatomic spaces, and accordingly decreases the density of the substance proportionally to the increase of length of the free-path motion of the atoms and the molecules.

Motion is defined as (1) the change of position of a body, with reference to other bodies; or (2) a change of position of the parts of a body with reference to each other; or (3) the change of position of the parts of a body with reference to other bodies. To illustrate these three phases of motion, we may use the following examples: The drifting of clouds, the movement of a bullet, or the free-path motion of atoms and of molecules, are motions in which the bodies move with respect to other bodies; the movements of the wheels of a clock, or of any machine, or the vibrations of atoms, illustrate the movements of the parts of a body with reference to each other; the movement of parts of a spinning top, of the parts of the earth, are motions in which the parts of a body move with respect to other bodies. These three species constitute the primary motions from which all others are produced as compound movements. For example, a free-path motion compounded with a vibratory motion, produces a wave or sinuous motion if the direction of propagation be at right angles to the free-path. A combination of a free-path motion with a rotary motion, may give a spiral motion. These forms of motion are propagated through the ether in which they are produced by atoms and molecules in vibration; as examples, we can cite the vibratory wave of light, the rotary waves produced by magnetic poles, and those which produce rotary polarized light.

The energy of atoms, which causes them to combine with other atoms, does not allow them to remain long in the free state, and the consequence is, atoms are nearly always found combined with other atoms to form a molecule. A molecule may be defined as the smallest part of a substance in which its properties inhere. Were the human eye capable of transmitting and the human brain capable of receiving the atomic wave motions, a most marvelous scene would be revealed in a molecule

of water. The chemically united oxygen and hydrogen atoms would be seen whirling and vibrating as partners bound together by the bonds of chemical affinity and yet not in apposition. Since, though, the power of chemical affinity draws them together, there is an opposing force that drives them apart, and the atoms naturally take the resultant; and since there is a difference in the mass and density of the two kinds of atoms, there must be a difference in the rapidity, and perhaps in other characteristics, of their vibrations. Not only are the atoms in active motion, but also the molecules are seen rushing here and there, apparently in the greatest confusion, colliding and rebounding from each other only to again collide and rebound, with a frequency that is not conceivable. That molecules have a vibratory motion similar to that of atoms, is not settled; but that they have a motion of translation cannot be doubted in the face of the evidence which supports this view, nor is there much doubt but that they have rotary motions in many instances.

But the motion of atoms and molecules can not be comprehended unless we conceive a medium between the atoms and within the molecules, in fact, filling all space, to receive and transmit as corresponding waves all atomic and molecular motions. While science does not know as much of the nature and laws of ether as it does of matter, there are many reasons for believing that a medium filling all space, and possessing the qualities ascribed to ether, must exist. Unless such a substance does exist, the undulatory theory of light is a farce, because it is evident that no waves could pass between the luminous and the illuminated body, unless there is a medium to receive and transmit them; one can not conceive of a wave motion where there is nothing to be moved. But the undulatory theory of light is not a farce; it is substantiated by unimpeachable evidence, and few theories of either chemistry or physics are better established than is this theory of light. Aside from the evidence furnished by the undulatory

theory of light of the existence of ether, *actio in distans* better appeals to the intelligence when this existence is postulated.

If a beam of sunlight be passed directly through a prism and allowed to fall upon a screen, it will be seen to have spread out into a patch of rainbow colors. This effect is produced by the waves of different lengths being refracted in different degrees—the longer waves less than the shorter ones—consequently these waves of different lengths are separated from each other and are represented by the different colors obtained. This phenomenon is called dispersion. It has been proven that the colors of the spectrum are due to ether waves, which have been measured, and whose dimensions have been accurately determined. These facts furnish additional proof of the existence of ether. Other phenomena that illustrate the saying "that truth is stranger than fiction," are to be observed when a beam of light is passed through a spectroscope. This instrument, called a spectroscope, consists of a prism or series of prisms, mounted between two tubes, one of which has an adjustable slit, through which the light to be examined is passed; the other is a telescope, which magnifies the image of the spectrum, so that it may be more plainly seen. With the aid of this instrument light from any source may be examined; that composed of all visible wave lengths will produce a complete spectrum, while that made of only a portion of visible wave lengths will produce an incomplete spectrum. The flame of a Bunsen burner possesses but little brightness and consequently it scarcely produces a spectrum, but a little salt thrown into the flame, causes a bright yellow tint, and also causes a bright yellow sodium band to appear in the spectrum. Hydrogen, another element, causes a red and a blue band to appear. Within the last thirty years all of the elements have been studied in this manner, and it has been determined that each element has a specific vibratory rate and causes corresponding vibrations in the ether. That each element, that is, the atoms of each element, have specific vibratory rates and that these vibrations cause corresponding vibrations in the ether, is not theory; it is

not a guess—it is demonstrated fact. Professor J. Clerk Maxwell says of this subject, that "molecules exist of various kinds, having their various periods of vibration, either identical, or so nearly identical, that our spectroscopes can not distinguish them. The same kind of molecules, say those of hydrogen, has the same set of periods of vibration, whether we procure the hydrogen from water, from coal, or from meteoric iron." Whenever, therefore, we see the hydrogen bands in the spectrum of sunlight or in the light of far more distant suns than ours, we know (1) that hydrogen, the same hydrogen with which we are familiar, exists in the distant sun; (2) because of the intense heat, it is in an incandescent state; (3) that the specific vibrations of its atoms have produced, in the ether, corresponding vibrations, which travel at right angles to the line of their propagation and come to us with the wonderful velocity of 186,000 miles per second. Is it not "stranger than fiction" that these light waves, resulting as they do from atomic and molecular vibrations and coming from suns so far distant, that, traveling at their high velocity of 186,000 miles per second, their transit requires hundreds of years for its completion, may be placed upon the witness stand and testify concerning their former far distant home? Mr. Outerbridge says: "When that marvelous little instrument called the spectroscope was devised it seemed that man had invaded fairy land and 'stolen a trap to catch a sunbeam,' for such it is in very truth. Not only does it catch the dancing sheaf of light, but it spreads it out into a band of exquisite colors, and exhibits to our fascinated gaze nature's palette of purest tints, out of which is woven the whole fabric of the gorgeous sunset, the variegated flowers, the bright plumage of birds, the iridescence of mother-of-pearl, the sparkle and hue of gems, and indeed every variety of color in nature or in art. But this little instrument is still more wonderful, for it combines with its quality of a trap the advantages of a balance, which many suppose is fine enough for the most fastidious fairy to weigh the nectar distilled in a dew drop, or other delicacy of the season." Our ideas of weight and size are purely relative, and that which

seems a small or light object from one point of view, may become large or heavy by a different comparison. By most of us, perhaps, a grain is regarded as a little thing, and when the apothecary and other small dealers divide the grain into halves, quarters, and even hundredths, we regard them as homœopathic visionaries and laugh at their absurd little pellets. There is a turning point, however, in every one's mind, beyond which objects appear important, because of their extreme minuteness; the most ordinary microscopic specimens bear evidence to this. But when we realize that the power of the spectroscope to reveal small particles of matter begins where the microscope searches in vain with its highest powers, we are astounded. The grain of matter may not only be divided into hundredths, or thousandths, or tens of thousandths, but into millionths and tens of millionths, and a single one of these particles may be detected and held up for our inspection by this subtle little searcher. Astronomers tell us that the tails of comets are often longer than the distance between the earth and the sun, and broad in proportion; yet if the matter diffused through this great space be properly compressed, it might be contained in a gentleman's portmanteau, or possibly in his snuff box. Still, we merely have to point our little instrument at this rarefied matter, and, as quick as a wink, we know its composition. "Not merely can we grasp infinitesimal particles at our hand, but we may sweep the firmanent, gather up the star dust, and tell its composition." The wave lengths that compose the visible spectrum are not all that are comprised in a beam of sunlight, but they are only that part capable of exciting physiological action in the human retina. At each end of the visible spectrum there are rays capable of being refracted and dispersed by a prism, reflected, absorbed and transmitted. The waves are called the heat and actinic waves of the spectrum, and like the visible spectrum they have their origin in the atomic vibrations of an incandescent body. Evidences that the earth receives energy from the sun present themselves on all sides, and it is so commonly observed that it needs no illustration. There have been several estimates of the

quantity of energy received by the earth as sunlight, and it is found to be about 134 foot pounds per second for each square foot of sunlight. This signifies that 134 foot pounds of energy is contained in a column of ether 186,000 miles long and one foot square, or about 12,000 foot pounds per cubic mile of ether. The energy given out by the sun is about 4,000,000 foot pounds, nearly seven thousand horse power, for each square foot of the surface of the sun.

Energy is not, as many persons suppose, an entity, but it is a capacity for doing work, and this capacity is determined by atomic or molar motion of matter. That form of energy determined by atomic motion I call kinetic energy; that determined by molar motion—the motion of masses—is called mechanical energy. A body at rest can not impart motion to another body, nor can a body in motion impart more motion than it possesses. Matter, in order to possess energy must have motion, either of its atoms or of its mass. This principle is embodied in Newton's first law of motion: "Whether a body be in a state of motion or rest, it will remain in that state of motion or rest until compelled by the action of some other body upon it to change its state." This is sometimes expressed by saying that all matter has inertia or inability to move, or, if it has motion to change its direction or velocity. This inertness of matter is found, experimentally, to be true of bodies whose magnitudes are great enough to permit observation; but there are in nature many evidences that it may not be true of the atomic divisions of matter. As an evidence, let us examine the energy of gunpowder, a substance capable of wrecking our strongest houses. The particles of sulphur, charcoal and saltpetre, which compose gunpowder, are apparently as inert as any known substance; as masses of matter, they conform to Newton's first law of motion, and, accordingly, they can only move when acted on by moving bodies. This fact is also true of the mixture of these bodies, gunpowder, a substance which has no mass motion to impart to other bodies, and must, therefore, be classed as inert matter. But ignite the gunpowder, and the large amount of

energy attendant on the conversion of sulphur, saltpetre and charcoal particles into a gas, is entirely out of proportion to the energy of the spark used to ignite the powder. This familiar example illustrates the conversion of molecular or kinetic energy into molar or mechanical energy. This is one of the many examples that might be offered as opposed to that construction, not infrequently placed upon Newton's first law of motion, that atoms are inert and without motion other than that imparted to them by bodies in motion. That atomic vibration is related, in a causative way, to atomic heat measured from absolute zero; that energy, which is motion, is a definite quantity in the universe; that it can neither be increased nor diminished, no more than can matter. That both energy and matter can undergo many transformations, lead us to conclude that energy, like masses, act when they are acted upon. This is not true, however, in that sense understood by those who believe in the doctrine of the inertness of matter; because an absolute zero has been closely approached, but never attained, by the most powerful aids known as yet to science. Therefore, no absolute knowledge of the manner in which atoms would behave when from under the influence of heat, can, at present, be obtained, though the recent experiments of Dewar with temperatures lower than any previously obtained, lead to the belief that at absolute zero atoms would be completely inert.

We have thus far only spoken of energy as a property or state of ponderable matter; but that it does exist in the ether that fills all space, is a well established fact. In the ether, energy takes the form of waves, and is known as ether waves. If we trace the sunlight back to its source, the sun, we find an incandescent body whose atoms are vibrating with an increased intensity induced by the intense heat. Our spectroscopes tell us that the specific nature of the vibrations is not altered, and hence, we conclude that their amplitudes are increased by the energy. The ether surrounding these atoms and penetrating the molecules is thrown into waves or vibrations caused by the vibration of the sun's atoms. These ether waves cor-

respond to the specific vibrations of the sun's atoms, and are consequently characteristic of the kind of atoms vibrating. Now, since these waves constitute the energy of sunlight, and are parts of the ether, it follows that ether contains energy. As Professor William Crookes says, "It has been computed, that in a single cubic foot of ether that fills all space there are locked up 10,000 foot-tons of energy which have hitherto escaped notice. To unlock this boundless store and subdue it to the service of man, is a task which awaits the electrician of the future. The latest researches give well founded hopes that this vast store house of power is not hopelessly inaccessible. Up to the present time we have been acquainted with only a very narrow range of etherial vibrations, from extreme red on one side to ultra violet on the other—say from three ten-millionths of a millimeter to eight ten-millionths of a millimeter. Within this comparatively limited range of ether vibrations and the equally narrow range of sound vibrations we have hitherto been limited to receive and communicate all the knowledge which we share with other rational beings. Whether vibrations of the ether, slower than those which affect us as light, may be constantly at work around us, we have, until lately, never seriously inquired. But the researches of Lodge, in England, and Hertz, in Germany, give us an almost infinite range of ether vibrations, or electrical rays, from wave lengths of thousands of miles down to a few feet."

Ether waves have another important property by which the amplitude of the waves may be increased, diminished or destroyed, accordingly as other ether waves with which they come in contact completely, partially, or do not at all correspond. This property is called interference, and is a property of waves in any medium. It is a matter of frequent observation that water waves are interfered with by other water waves; for example, let water waves traveling in opposite directions meet—their amplitude will be increased if the two sets coincide in their upward and downward motions, when trough and crest of one set coincide with trough and crest of the other set; if the waves

do not coincide the upward motion of one set corresponding to the downward motion of the other, the amplitude, in case the waves are not equal, will be diminished, while, if the waves are equal, calm water will result. Sound waves are subject, in a similar way, to the influence of interference. For example, if two tuning forks have the same number of vibrations, they will give out the same continuous musical note; but if we change the vibrations of one by attaching something to it, the vibrations of the two will no longer coincide; consequently the sound produced will no longer be a continuous musical note gradually dying out, but will be an alternate rising and falling sound. When one instrument vibrates more rapidly than does the other at a certain point, the waves of the two will coincide and the note will be clear and distinct; but as the slower vibrations lag behind, they interfere with those of the other tuning fork and consequently the sound is decreased until the crests of one set of waves fall upon the troughs of the other set, when silence will ensue. From this point the sound is gradually increased until the starting point is reached, when the same process is again begun. This principle of interference which Sir John Herschel says "has hardly its equal for beauty, simplicity and extent of application in the whole circle of science, applies in the same manner and to the same degree to ether as it does to water or sound waves. To this fact, many of the phenomena of light are due, but we can not now enter into the details of the interference of light waves, except to say that waves of light having different vibrations from other waves of light may be made to fall on the latter so as to produce darkness. From all of these facts we see that two sets of light waves may produce darkness, and silence may be produced by two sets of sound waves.

Since a knowledge of the foregoing principles is necessary for an understanding of the properties of ponderable and imponderable matter, I do not feel called upon to apologize for occupying your time with a statement of these accepted principles; on the contrary, however, I feel it my duty to apologize

for the imperfect manner in which I have treated them; the details of the subject should have been more elaborate, and the relation between motion in matter, and in ether, should have been more fully explained and illustrated. I realize, however, that my time tonight is limited, and by extending my discussion beyond this limit I would trespass on the time of those who follow me.

Let us again observe the activities and construction of molecules of water. We have seen how the atoms are collected, by means of chemical affinity, into groups or molecules, the atoms at the same time continuing to vibrate in their specific vibrabrations. As yet we have not considered the specific vibrations of molecules, and here it may be asked: "What constitutes the specific vibration of molecules, and on what does it depend?" A molecule, as we know, is not a simple, single, elastic body, nor is it a rigid agglomeration of resting bodies; on the contrary, the molecule is a collection of atoms, each of which has its specific vibration and its motion of translation. We have seen that atoms produce, in the ether, waves which correspond to their motions, and we have also seen that ether waves are subject to interference. Therefore, it is not difficult to conceive that the specific vibration of a molecule consists of the specific vibrations of its atoms, as modified by the interference of the ether waves produced by the atoms; or, in other words, it is the resultant of the atomic vibrations. It is by this hypothesis that we explain metamerism. For example, let us take the di-chlor-ethanes, two entirely different compounds, but both represented by the formula C^2, H^4, Cl^2. Here we have two compounds of exactly the same composition, yet they differ widely in their chemical and physical properties. We immediately ask ourselves why this should be as it is. Ira Remsen, of Johns-Hopkins, tells us that "the cause of isomerism is undoubtedly to be found in the different relations which the parts of the isomeric compounds bear to each other. Our structural formulas, which show the relations between the parts of compounds which have been traced out by a study of the chemical conduct of these compounds, give

us an insight into the causes of isomerism." Let us consider for a moment, the effect which would be produced by a change in the manner of grouping of the atoms. We know that the chemical and physical properties of a substance depend upon the nature of the molecule, or, to be more explicit, upon the nature of the specific vibrations of the molecules of that substance. We have seen, in the course of this paper, that the specific vibrations of the molecule are the resultant of the ether waves, induced by the specific vibrations of the constituent atoms, plus their interference. In other words, the chemical and physical properties of a substance are determined by the specific vibrations of its atoms and the interference of the ether waves produced by these vibrations. It is evident that if the properties of a substance depended only on the vibrations of its atoms, no such phenomenon as isomerism could exist. Therefore we must conclude that the interference is the potent factor of isomerism. This conclusion can be arrived at by other paths. For example, let us take two isomers, the di-chlor-ethanes, and examine their constitution. We know positively that the only difference between the two is a different grouping of their atoms, and we accordingly conclude that the only thing that could possibly be affected by this difference in grouping is the interference of the ether waves. All these evidences point to the view that ether waves determine the activities of all substances, and since drugs are included as substances, we conclude that the activities of drugs depend upon the ether vibrations of their constituent atoms, as modified by the interference of the same.

Admitting that the chemical and physical properties of a drug are the expression of its ether waves as produced by the atomic vibrations and modified by their interference, we have yet to explain the therapeutic properties of these substances.

Before examining this question, I must tell you that we are entering an unknown region, as yet unlighted by the maps and guides of modern science, and the only means of obtaining information is by focusing the light of adjacent facts and analogous phenomena and feeling our way slowly into the dim light

thus obtained. If then the explanation of the relationship between the kinetic and therapeutic energy of drugs is defective, in that it cannot be demonstrated by experimental evidence, we must not consider this as evidence against the truth of the explanation, but rather as testimony to paucity of exact information bearing upon the subject.

If we accept the teaching of science, that all matter is composed of molecules, which are made up of atoms, we must admit that the tissues of the human body offer no exception to this rule; consequently the same laws of matter, motion, and ether apply to these structures as well as to others. Further, since chemical and physical properties of a substance are the result of its atomic and molecular structure, and the kinetic energy of the matter is the expression of the ether waves, resulting from the atomic and molecular vibrations, the matter composing man's body, in the absence of opposing evidence, should not be regarded as differing in organic structure and physical energy from matter in general. Some will doubtless urge that vital energy, to which the phenomena of living matter are due, is not physical energy, and consequently this argument is faulty in that it attributes vital energy to physical force. I admit that the intimate nature of vital phenomena have as yet remained undiscovered by man's investigations. We can not ignore the evidence that supports the belief that vital energy is co-related to physical energy; in fact it is physical energy transformed by the organs and tissues of the plants and animals through which it operates. Since the molecules of the body are collected into cells, the cells into tissues, and these tissues into organs, it follows that the different structures of man's body are, as regards their energy, identical to matter outside of the living body.

Now, if this line of argument be applied to drug therapy and followed to its logical conclusion, we find a rational explanation of the therapeutic action of drugs. This action is the result of the activities of the molecular waves of the drug on one side, and those of the body on the other. The theory of the kinetic energy of matter is, as I have shown, not an hypothesis, but a well

grounded theory. When I say, therefore, that therapeutic energy is determined by the molecular waves of the drug and the molecular waves of the tissues, it is the same as saying that therapeutic energy is determined by the kinetic energy of the drug and the kinetic co-energy of the tissues of the body. In order that we may have a clear and intelligible conception of this theory of the manner in which drugs produce their therapeutic effects, let us keep in mind the following three important principles: (1) Molecular waves and molecular energy are reciprocal terms; (2) the energy of waves is the measure of their amplitudes; and (3) waves which are superposed will have their amplitudes increased, diminished or detroyed, according as they exactly coincide, partially coincide, or exactly oppose each other.

The effect produced in the organism may result from the molecules of the drug coming within the range of the activities of certain free or loosely combined molecules of the body, such as the albuminoid molecules of blood and lymph, or the drug may affect more remote tissues by means of the nervous system. The kinetic energy of a drug, however, will not indiscriminately affect the tissues of the body, since the relationship that exists between waves of light or waves of sound must be evident between the molecular waves of the drug and those of the tissues before there can be a manifestation of therapeutic action. But the effect resulting when one set of waves falls upon another, will be determined by the nearness of their coincidence in time and periods; when the waves coincide, there will be an increase in the amplitude; when they are not coincident, the amplitude will be diminished—the effect inhibitory. The phenomenon of the selective activity of drugs, or what is termed their specific energy, is, in principle, analogous to many familiar phenomena of light and sound. As an illustration, let us take the following: If, in a closed room containing an open piano, a note be struck on a violin, the string of the piano giving a corresponding note will be vibrated. This vibration may be made evident to the eye by placing paper riders astride the piano strings; as the violin

note is sounded, the corresponding piano string will be vibrated by the sound waves passing to it, and the rider will be thrown off. Thus we see that the vibrations of the strings of the two instruments must correspond in time and periods in order to produce this induced sound. The physiological reaction of the eye to light waves, the preference of the ear for sound waves, of the nose to olfactory waves, etc., all these are believed to be the effects produced by the construction of these organs so that they are sensitive only to waves in unison with themselves.

May not the selective action of drugs—that is, that property possessed by drugs of acting upon certain tissues or groups of tissues—likewise depend on wave coincidence? That this is true is of course an assumption, since there is no known means by which the value and measurement of such waves can be determined. However, when we consider the analogy between these and other phenomena, is not the assumption warranted? Do not the known facts almost establish the truth of the hypothesis that wave coincidence determines the selective action of drugs? We know that it is comparatively easy to determine the lengths and periods of light and sound waves; but it is much more difficult, if not impossible, to ascertain those of the waves of substances so complex as many of vegetable drugs and the tissues of the animal body; as, for example, the extremely complex albuminoid molecules that constitute the major portion of an animal. In working out this hypothesis we must not overlook the nervous system, by means of which the energy transferred by the wave impacts of the drug is conveyed to remote parts of the body. Exact knowledge bearing upon this subject is so meager and the complexities of the subject so numerous and intricate that it is hardly possible to produce order in such a seeming chaos. Therefore, we must be content with (1) a summary of certain accepted truths concerning this question, (2) a supplement of these truths by others that have not yet been considered in this address, and (3) the exhibition of evidence showing that an *a priori* argument from these predicates confirms the new theory advocated by me. In order to

save time I will arrange this summary in the form of propositions, as follows:

1. Atoms are the smallest possible divisions of matter. 2. Atoms have both a specific vibration that is definite and characteristic for the species of atoms, and a motion of translation. Atomic motions result from atomic heat measured from absolute zero. 3. Atomic vibrations cause corresponding vibrations in the ether, and these ether waves that are produced are influenced by inference. 4. A molecule is composed of two or more atoms, and is the smallest part of a compound substance which possesses its properties. 5. Molecules vary in size and complexity; molecules of inorganic substances are comparatively small and simple, while organic molecules, and especially those of organized structures, are large and complex. As crystals possess cleavage planes, molecules have points of weak union at which they are most easily broken. 6. The ether wave of a molecule is the resultant of waves of its constituent atoms, and the interference of these atomic waves. 7. The kinetic energy of a molecule is the expression of its ether waves. 8. The kinetic energy of a substance is the sum of the energy of its molecules. 9. The characteristics of the ether waves—hence the nature of the energy—*cæteris paribus*, varies with the manner of atomic grouping. 10. Different forms of energy may be transformed into each other; but the quantity is in no way altered by the transformation. 11. Every physical change has a physical antecedent, and is conditioned by the laws of energy.

Following the true argument that is an outgrowth of the scientific principles just enumerated, I will endeavor to trace the course and action of a drug in the human body. In order that a drug exert its full power, its molecules should be separated either by dissolving it, or by triturating it with an indifferent substance; since, in this condition only is it free to select and influence those tissue elements of the body for which it has special affinity. These tissues may consist of groups of albuminoid molecules that are either not at all or very loosely

combined in the fluids of the body; or they may be the nervous elements of the body which are especially susceptible to such influences. The effect resulting from this contact of the drug molecules with those of the albuminoids, can be better comprehended after we have considered the intrinsic nature of the latter mentioned bodies. The albuminoids compose the large bulk of the soft tissues of the body. The name proteid, sometimes applied to these bodies, well indicates the numerous forms in which they exist—forms which have a family resemblance, but which do not agree in many important particulars. We must remember that the albuminoids serve as a food for the many tissues and organs of the body; therefore, in order that they may be assimilated by these diverse tissues—and they are—they must exist as many isomeric compounds.

If, as we have reason to believe, these bodies exist as isomers, it follows that the waves produced by a certain drug might coincide with a group of these substances and not be coincident with other groups. We know that coincidence of wave motions is invariably followed by an increase in the amplitude of the vibrations. This increased amplitude affects both the drug and the albuminoid. The latter compound is, however, a very unstable substance, and possesses, as we have seen, certain lines of weak union along which it most readily breaks. The products resulting from the disruption of albuminoids are often in their nature toxic; as indol, cresol, skatol and uric acid. The resulting product of such a decomposition would, of course, be determined by the molecular natures of the two substances concerned—the acting substance and that acted upon. The results of the kinetic energy of drugs, toxins and tox-albumins on the albuminoids of the body, open a broad field for rational speculation, into which I am inclined to enter. I am warned, however, by the length of my address that such a diversion would involve a trespass on your time. Therefore, I leave the question by saying that within this field there lies hidden the mystery of infection and immunity; and when the rationale of serum therapeutics becomes understood, we will find that the

changes produced in the albuminoids of the body by the kinetic energy of bacteria are causatively connected with its phenomena. Coming back to our subject, we find that the changes produced by the immediate contact of the molecules of the drug, with those of the albuminoid, are much more easily followed than are changes produced in tissues indirectly by means of the complex structures of the nervous system.

A person's conception of the *modus operandi* of drugs upon the nervous system will, of course, be shaped by his ideas of nerve force and its mode of propagation. The exact nature of nerve action is unknown; but that nerve force is capable of being propagated along a nerve fibre, is an undoubted fact. That which is capable of being propagated must either be something moved or a form of motion; that is, it must be motion of a mass along the fibre, or a motion transmitted by means of the constituent elements of the fibre. We know that nerve energy can not be motion of a mass; no material atoms can be moved along the fibre. Therefore, we must conclude that nervous force is a motion of the elements of the fibre, a wave motion transmitted by the movement of the molecules of the nerve. This conclusion forces us to believe that nerve force is a form of physical energy, and is correlated to other forms. Every axis cylinder of a nerve fibre is believed to be composed of a great number of fibrils, each of which is a distinct conducting body, and is continuous with the structures in which the nerve impulses arise. Furthermore, we have reason to believe that, in the fibrils of a nerve, there are differences of molecular structure corresponding to the wave impulses it is capable of conducting; in other words, there must exist between the molecular waves of a nerve fibril and those of the stimulus a coincidence in periodic time. If, to our knowledge of nerve structure and mechanism we add the special features distinguishing the different kinds of nerves,—sensory, motor, special senses and inhibitory; and if we remember that the nerve fibrils are continuous with the grey matter of the brain, in which they arise; that continuity of structure is not always

necessary for continuance of function; and that molecular energy is the reflex of molecular motion, added motion being added energy, capable of exciting chemical action—remembering these things we need not strain our imaginative faculty in believing that the therapeutic and elective energy of a drug is definitely related to the molecular energy of the nerve fibres through which it operates.

The organ of corti, with its intricate mechanism of rods and fibres, each having a different pitch, has been likened to "a harp of a thousand strings." Each string receives and transmits, by means of the fibrils of the auditory nerve, to the sensorium, only those sound waves that vibrate in unison with itself. The nerve fibres may be called harps with a million strings; and string, or nerve fibril, is attuned to receive and transmit only waves of energy that vibrate in unison with itself. I do not wish to be understood as saying that nerves transmit only those forms of energy derived directly from molecular motions, because such a statement would be absurd, for the most ordinary observation of physiologists teach us that either sensory or motor nerves may be influenced by molar motion. This, however, is not opposed to my contention, because if we were able to trace the modifications of mass motion induced by the organs of tactile sensibility, or, when vigorous, by the molecular disturbances in the nerves receiving them, we would doubtless find that the mass motion is, in these cases, converted into molecular motion. Yet any nerve may conduct an energetic impulse, while a slight one will be transmitted only by a special nerve.

The amplitude of the waves, we have seen, is the measure of their energy; therefore, when coincident waves are superposed—as those of a drug and of a nerve fibril—the amplitudes of such waves will be increased, since the energy of the drug is transferred to the nerve as amplified wave motion. I think that you will agree with me when I say that this is neither a fanciful nor improbable statement, but, on the contrary, it is strictly in harmony with modern theory, and is analogous to the phe-

nomena recurring in the eye when coincident wave vibrations affect the terminal fibrils of the optic nerve, or that seen in the ear when sound waves vibrate in unison with the terminal fibrils in the organ of Corti.

The kinetic energy of a drug is the sum of the energy of its molecules. This sum is a set of ether waves recurring in distinctive periods of time; and they are capable of stimulating—that is, will transfer their own motion—to nerves that are atune, as it were, to them. The energy, or stimulus, received by the nerve from the drug consists of molecular wave motion; and whether the energy is derived from organic or inorganic, from living or from lifeless matter, makes no difference, since it is always ether wave motions corresponding to the atomic vibrations. It is undoubtedly true that the motion transmitted by a nerve fibre has been, in some unknown manner, modified by the structures through which it operates. The correlations of such waves are, however, not destroyed by the transformation nor are they less physical than before—they have acquired a new manifestation, that of vitality. I think I can safely predict that the mystery obscuring the subject of vital force will finally give up its secrets to physical investigation. The prevailing belief that vital force is not physical and is in no way connected with it, is a product of that disposition of man which causes him to ascribe supernatural causation to all phenomena that are difficult of explanation. But our inquiry is concerned with the correlation of physical and vital forces, rather than with the unknown causes of their transformation. The fact that the energy required to operate the various physiological processes of the body is obtained from the food consumed by the organism, and that the one is the exact measure of the other, furnishes strong if not conclusive evidence that the vital energy required to continue these processes is only a correlated form of physical energy that can be traced directly back to a physical origin.

As others have done before us, we may disagree with regard to this point, but there is one matter, and a very important one,

on which we may all agree; that is that the amount of energy liberated by a nerve impulse is very much greater than the amount used as a stimulus. This fact is exampled by the reflex actions produced by tickling the soles of the feet, or in the contraction of certain groups of muscles, caused by an impulse from the will. This phenomenon may also spring from impulses originating in a drug. While I must believe that the amount of energy liberated by a nerve is generally proportioned to the dose of the drug, this is not necessarily the case; as, for example, the amount of energy required to produce tetanic convulsion bears no proportion to the amount contained in the strychnia necessary to cause them. This fact that drugs may cause the release of more energy representing the chemical changes in the tissues than they themselves possess, has an important bearing on the new theory I have attempted to expound, and teaches us that important changes of structure, involving reactions and the consequent release of energy, can result from the comparatively small amount of energy transferred from a drug to a nerve. The extent to which chemical changes in the tissues occur and the amount of energy liberated by the nerve impulse, depends largely on the stability of the tissues acted upon. When the molecules of the tissue are held by little affinity and the attracting and repelling forces are nearly equal, an insignificant amount of vibratory motion, if coincident, will serve to disrupt the substance; but, on the contrary, when the molecules of the tissue are held together by much affinity and the attracting and repelling forces are less evenly balanced, a large amount of added motion—as nerve impulses—is required for their disruption.

If time permitted me to point out the bearing of this theory of drug and therapeutic energy, on certain mooted questions of medicine, as "tolerance of drugs," the varying effect of toxics on different species of animals, the *modus operandi* of suggestive therapeutics, and the nature of inhibitory nerve force, I think that I could adduce additional evidence to strengthen my argument.

But I have already taken too much of your time, and consequently, I'll close my paper by inviting your attention to some phenomena of common occurrence, wherein therapeutic results are obtained from familiar forms of physical energy, that are undoubtedly forms of wave motion. Let us examine briefly the therapeutic effects of electricity, of heat, of light and of sound.

That electricity is a therapeutic agent, and that it is capable of affecting chemical changes in the tissues of living organism is a proposition which, I feel sure, you will not deny, nor will you require of me the citation of authority to sustain it. Evidences of its therapeutic energy will arise in the mind of every medical man, and are familiar to many who have no technical knowledge of medicine. It is conceded by those who are acquainted with the laws of electricity that this energy is a form of ether wave motion, and it follows that its therapeutic energy is identical. The chemical changes produced in the body by electricity, like those caused by drugs, are the result of ether wave action. Electricity, at least, must work by virtue of its waves, since these comprise its dynamic energy, and that drugs act in the same manner is an assumption warranted by analogy.

Heat, another form of physical energy whose wave have been measured, is also a well recognized therapeutic agent. It may be said of heat, and perhaps truthfully, that it is an increased atomic and molecular activity induced by heat waves. The same may be true of electricity, of light and of sound; electrical waves may induce electricity, light waves may induce vision and sound waves may induce hearing in substances whose molecules vibrate in the necessary periods of time. Yet, admitting this, the fact remains that the waves of these forms of energy are the agencies that convey energy from one substance to another. When, therefore, heat is spoken of as a therapeutic agent, the waves conveying this particular activity of atoms and molecules, is the agent referred to. In this sense, then, heat is a therapeutic agent by virtue of its particular form of waves; and it furnishes additional evidence that drugs may act in a similar manner.

Light, another form of wave motion, is necessary to the comfort, health and life of mankind; and must, therefore, influence the growth and nutrition of his body. Being itself a form of ether waves, it can induce chemical changes in the body only by the influence exerted by these waves on the molecular activities of the tissues. This claim I also make for drugs.

We also admit that sound is a form of wave motion; but, unlike the preceding forms of energy, these motions are propagated by means of the air. This fact does not, however, influence my argument, since there is abundant evidence that the ear contains resonant cords capable of conveying these vibrations to the sensorium, where they induce chemical changes in the delicate tissues of the brain, thereby liberating energy which passes along the nerves as vibratory motion, and induces other changes in remote parts of the body. The influence of music upon the human organism furnishes many examples illustrating this fact. For example, martial music inflames man's military ardor; sacred music, his feelings of religion; while slow monotonous tones, such as the sound of a distant waterfall, the patter of rain drops, or the nurse's lullaby, are among Nature's most potent soporifics. Indeed, if a man "hath music in his soul," his emotions, the expression of his face, and the attitudes of his body may be excited or changed in a most wonderful manner. It is said that "music hath charms to soothe a savage breast," and yet when we analyze this power we find that it consists simply of waves of condensation and rarefaction, which are transmitted to the sensorium via the auditory nerve, whose terminal branches, in the organ of Corti, are timed to vibrate in unison with such waves. Since the mind and body of man can be moved in so marvellous a manner by the simple impact of sound waves on the organs of hearing, is it not possible—is it not probable—that the molecular waves of drugs, which constitute their dynamic energy, act in a similar manner on albuminoid and nerve structures that vibrate coincidently with the drug molecules?

PAPERS

READ BEFORE THE

TWENTY-SEVENTH ANNUAL MEETING

OF

The Texas State Medical Association.

DALLAS, TEXAS,

April 23d, 24th, 25th and 26th, 1895.

SECTION ON GENERAL MEDICINE.

REPORT OF CHAIRMAN, J. W. CARHART, M. D.

LAGRANGE.

I think it fair to presume that the members of this association are as fully posted in regard to the advances in the department of the practice of medicine during the past year as is the chairman of this section.

By a glance at the programs of this section which we are able to present you, it will be seen that it is rich and varied, and promises a rare treat from some of the ablest men in our profession to be found in this country.

The able papers that have been prepared for this section with great labor and after thorough investigation, must all be read; and in order that justice may be done the writers, and that the members of this association may have the benefit of their labors, it would not be becoming in me to consume your time with a long report calling attention to matters of minor importance, which you have all read in the journals of the year.

I will, therefore, content myself with an introduction of the work of this section by a reference to but two matters of special interest—anti-toxine for diphtheria and tuberculin modified by Prof. Klebs.

I need not consume your time with a recital of the history of the Behring serum therapy, as you are all familiar with it. There can be no doubt of the lowering of the death rate from diphtheria by the use of serum therapy. It is true that it has been suggested by eminent practitioners that the lowering of the death rate may be due rather to the fact that the disease is not as malignant as formerly than to the serum therapy.

This point, then, must be settled by actual demonstration. The course adopted by the Massachusetts board of health will furnish ample facilities for complete demonstration. The secretary of the board of health of Massachusetts has announced that the board is prepared to furnish, without cost, the anti-toxine serum to physicians in localities of the state who from any cause find it difficult to obtain the serum from reliable sources. Each bottle is marked with a number and the date of preparation of its contents. No anti-toxine will be issued except upon a pledge that a full statement of the observed effects of its use will be returned to the board at the termination of the case. In all instances possible a bacterial diagnosis will be insisted upon.

The Massachusetts board of health does not intend to speculate in anti-toxine serum.

The cost of the Behring serum has been and is likely to continue to be a serious impediment to its use generally. So long as old, broken down coach horses worth $40 can be made to yield $3,000 to their owners in rendering serum, the avariciousness of men will keep up the price of the serum.

Until more light is thrown upon the unfortunate case of Miss Bertha Valentine, in Brooklyn, whose death followed in ten minutes after an injection of the serum, there will necessarily be felt some timidity in regard to its use. I am aware that Dr. E. H. Wilson, chief bacterologist of Brooklyn health department, says that two bottles of anti-toxine of the same lot as that used in the case of Miss Valentine showed no living germs of any kind; and yet her sudden and violent death in ten minutes after the injection, and from no known cause, remains a fact; and the possibility of similar deaths is also a fact.

Dr. Klebs, in an interview with Dr. I. N. Love, of St. Louis, on November 30, 1894, said: "The chief objection is the danger of transmitting other diseases from the animal to the individual treated. Knowing the numerous infectious germs which inhabit the animal creation, giving no superficial evidence of their presence, I can not believe it safe to use the serum of any

immunized animal unless it has previously been demonstrated by a skillful post mortem examination that said animal is free from any and all infection."

Such examinations are not likely to be made, for the reason that it would be killing the goose that lays the golden egg.

We are all familiar with the furor over Koch's tuberculin, and the shock to the medical profession and the general public of its failure. Great good, however, has come out of Koch's discovery, and vastly more is to be realized. It was soon discovered that, whilst Koch's lymph cured tubercle in guinea pigs, when injected into the human subject it produced toxic effects, and was, therefore, too dangerous to be generally used.

Dr. Klebs noted this defect, and setting himself to work along this line, has succeeded in eliminating the toxic properties of the serum, thus producing a remedy which retains all the germ destroying properties of Koch's serum without the toxic effects, and which he calls anti-phthisine. With the eliminated toxines he produced toxic effects in guinea pigs, whilst with the anti-phthisine he easily and quickly cured tubercle in guinea pigs.

Prof. Klebs spent last winter at Asheville, N. C., with his friend, Dr. Carl von Ruck, where he established his laboratory, and with ample clinical material at his command, we are looking for splendid results from his labors.

THE CLIMATIC CAUSATION OF DISEASE; WITH CHART SHOWING PATHOLOGICAL DISTRIBUTION OF CLIMATE IN THE UNITED STATES.

I. M. CLINE, M. A., M. D.

GALVESTON.

This subject, while one of the broadest in its scope, and dealing directly with the physiological effects of the medium in which we have our existence, is perhaps the least understood of all the questions bearing on the etiology of disease, and has received the smallest amount of attention from scientific investigators of any of these matters.

The reason for this is at once obvious, for there are many barriers to the study of this question. It is a difficult task to collect statistics from which to study the causes of disease, especially in sufficient numbers to give reliable results. The cause of many diseases, however, can be studied from mortality statistics, of which there is a vast amount accessible. Where the disease is one attended with occasional fatality the deaths furnish a basis for the study of this subject. When large populations are considered, it is safe to assume that on an average the daily, monthly or yearly deaths from a disease will bear a constant proportion to the cases of sickness from that disease, and such being the case, very accurate studies can be made of the causes of those diseases from which deaths occur, for whatever aids in the cause of a disease will show its effects in the latter stages as well as in the first; and it follows that deaths should be more frequent with or immediately following those conditions of climate which tend to cause the disease. There are, however, objections to offer to this method, such as

mistakes in the diagnosis of diseases and irregularities in their nomenclature. This, it is true, makes the question more complex and difficult to study, but results of sufficient accuracy can be obtained to lead to correct conclusions as to the relation of climate to the cause of the disease. To accomplish even small results in this line requires years of hard labor, and that the investigator have both medical and meteorological training.

It is gratifying to note that some of our leading medical institutions are introducing meteorology as lectureships, and it certainly can not be many years until medico-climatology will be recognized as of such importance that all first-class medical institutions will accord it a chair in their faculties. We are taught that in the study and practice of medicine the end in view and the object to be attained is a knowledge of how to prevent, relieve and cure disease. The application of this admonition consists not only in the administration of medicines, but also in a thorough knowledge of all matters which influence the various morbid conditions to which the human economy is liable. There can be no doubt that of the many factors which contribute to help or hinder physical well being, a very large share must be attributed to climate, understood in its widest sense, particularly to those conditions of atmosphere and soil which are constantly operating upon the human organism both day and night. The air breathed, its temperature, vapor of water, purity and pressure, the amount of sunshine received, the character of the winds, and the nature of the soil, all have a potent influence upon the organism in health in causing or preventing disease; and a still more potent influence upon it in its unstable and sensitive condition when already the subject of disease.

The position occupied by the physician in this respect is one of great responsibility, and, notwithstanding the vastness of the subject, it is attracting the attention of the leading medical practitioners in all parts of the country. It frequently falls to the lot of the physician to select a climate for a patient which determines whether or not life shall be prolonged and suffering

relieved, and a mistake is fatal. During the ten years I have been connected with the weather service in Texas I have received a large number of communications from physicians in the populous centers throughout the country looking for climates in which to locate their patients to the best advantage. Information concerning the prophylactic and therapeutic properties of this or that climate is being diligently sought. The conclusions which have been reached in regard to these properties of climate have until within the past few years been altogether empirical, and are in a great measure so yet in so far as the profession is advised, although definite conclusions have been reached relative to the effects produced by climate on some of the more important diseases. By the study of the effects of different climatic conditions and changes on the different organs from what we know of the physical effects produced by such conditions and changes, and the study of the relation of diseases to these conditions by the correlation and study of a vast amount of actual facts, results are reached which are fast paving the way from empiricism to logical and sound conclusions. Some valuable, though limited, investigations relative to the climatic distribution of pulmonary phthisis in Massachusetts were made by Dr. H. I. Bowditch of that state some years ago, from which he reached the conclusion that the disease was more frequent in low damp localities than on higher land.* Similar investigations were made a few years later by Dr. G. Buchanan, of England† relative to the distribution of the same disease in that country, and he arrived at similar conclusions to those of Dr. Bowditch. It remained for Dr. H. B. Baker, secretary of the state board of health of Michigan, to commence the study of the relation of climatic conditions to the cause of certain diseases, and while his work is devoted to the seasonal relation which exists as the cause, his results are of great value.‡ I have gone more minutely into this question, and have investi-

*Med. Com. Mass. Med. Society, Vol. X, No. 11, 1862.
†Tenth Report of the Officer of the Privy Council, 1867.
‡Annual Reports of the Mich. State Board of Health, 1886, *et sequel.*

gated the relation between the causation and fatality of certain diseases and weather changes which take place from day to day, as these appear of greater importance than the seasonal changes on account of their suddenness and frequency, which even shock the system when in health; and have also studied the causes for the climatic distribution of diseases.*

To ascertain the climatic causation of disease the physical effects produced by known climatic conditions and sudden changes in the weather on the different organs of the human economy must be understood as well as the climatic influences which produce these effects. The weather bureau keeps the climatic record for nearly every county, and with these conditions known, and also a knowledge of the diseases which prevail in each locality, the desired results can be obtained. Congress has made appropriations for investigations pertaining to climatology and sanitary science† throughout the country under the United States department of agriculture, weather bureau, and there is no doubt but that much will be accomplished in this respect in the near future.

Temperature and moisture conditions play the greatest part of all climatic factors in determining the healthfulness of a locality. The purity of the atmosphere is also an important feature, and one which must be kept constantly in mind. It is only on account of the general relative purity of the air which makes this condition second to the preceding ones. The purity of the air for low levels depends in a great measure upon the source from which the winds are derived; if they are continental they contain more or less impurities at all times, while if they are oceanic they contain chlorine and other antiseptic and disinfectant properties. The purity of the atmosphere increases rapidly with an increase in elevation. The amount of sunshine received, which acts as a powerful purifying agent, is of great importance.

In the investigation of this question there are some physical

*Special Bulletin, No. 4, Texas Weather Service, August, 1894.

†An act making appropriations for the Department of Agriculture for the fiscal year ending June 30th, 1896; Weather Bureau, General Expenses.

deductions concerning the capacity of the atmosphere, with different temperatures, for moisture which must be kept in mind. From the meteorological tables of Guyot* it is ascertained that a cubic foot of air at a temperature of zero (Fahrenheit) can contain only 0.5 of a grain of vapor of water; at 32 degrees it can contain 2.13 grains, at 65 degrees it can contain 6.8 grains, at 95 degrees it can contain 17.14 grains, while at 98.5 degrees, or the temperature of the body, it can contain 18.96 grains, which is nearly nine times the quantity which can be contained at a temperature of 32 degrees. Air at a temperature of 32 degrees, and saturated with moisture (that is with 100 per cent relative humidity) contains only one-fourth the quantity of vapor of water which exists at 50 per cent of saturation with the temperature at 95 degrees. Evaporation increases with a rise in temperature more rapidly than it does with a decrease in moisture, which is due to the rapid increase in the capacity of the atmosphere for moisture with increase in temperature as just noted. Evaporation from the external surfaces of the body under ordinary conditions carries off through the skin a large amount of water with organic matter and salts from the system; such being the case, a sudden fall in temperature, or an increase in the amount of moisture not accompanied by an increase in temperature, checks this action and increases the labors of the respiratory system, the kidneys and other eliminative organs, which, through any predisposition to disease or temporary weakness, often causes serious diseases. Any sudden weather changes are unfavorable to the successful treatment of most diseases, but in a few diseases certain changes prove favorable. Decided change in temperature excites the nerve centers, and in exciting the vasso-motor center disturbs the vascular system and causes the capillary vessels to become gorged and paralyzed, which is a cause for inflammation in the parts so affected. This effect is most pronounced in decided falls in temperature. Conduction of heat from the body to the

*Guyot's Meteorological Tables, 1851, pp. 92-93.

atmosphere increases with the increase in the amount of vapor of water suspended in the air, as water vapor is a better conductor of heat than dry air, and is an important factor in studying the effects of the temperature of the atmosphere on the body, both externally and internally. The range between day and night and sun and shade temperatures produces marked effects on the human organism. These effects are most pronounced during the summer months, when the differences between day and night temperatures, especially where there is much radiation, often amount to 50 or 75 degrees, and that between sun and shade temperatures amounts to 40 or 50 degrees. After fatigue in the sunshine during the day, when night comes on, or in retiring to the shade during the day, a decided change in temperature is experienced. The difference shown by the thermometer between day and night and sun and shade temperatures is not all that is felt. This is materially augmented by conduction, where there is considerable moisture, and the cooling effects of evaporation. When the body has been exposed and forced to adapt itself to high sun temperatures and is suddenly transferred to a medium with the temperature 50 to 75 degrees below the sun temperature, and the organism at at rest, it is subjected to rapid cooling, by conduction of heat from the body to the atmosphere, by radiation and evaporation, which contracts the capillaries of the skin and interrupts the blood in the proper performance of its functions, and often results in local or general congestion.

The effects which are produced by the differences in the capacity of air, at different temperatures, for vapor of water are most marked on the respiratory system, for here we have not only to consider the external evaporation, but in some climates excessive internal evaporation. Air at moderately low temperatures (not even below 32 degrees) when inhaled has its temperature increased to that of the body, 98.5 degrees, at any rate to within three or four degrees of this, and its capacity for moisture is greatly increased on account of the rise thus brought about. With an average of twenty respirations per minute,

which is 28,800 per day, and the amount of air taken into and expelled from the lungs at each respiration 21 cubic inches* we have a total of 350 cubic feet of air used in respiration daily. Physiologists are generally agreed that the quantity of vapor exhaled from the lungs depends greatly upon circumstances, such as the rapidity of respiration, dryness or humidity of the atmosphere, and the activity of the pulmonary circulation. It is apparent, however, that the quantity of water given off from the system in the form of vapor in excess of that received during respiration depends almost entirely upon the temperature of the air inhaled. Assuming that the air leaves the body at a temperature of 98.5 degrees, and saturated with moisture, it would carry off from the lungs daily 6,636 grains of water in the form of vapor. The important point in this connection is the excess in the amount of water exhaled from the lungs over that inhaled. For example, take a locality with the average daily temperature of 32 degrees during the cold months (there is a large area of the United States with an average daily temperature below this during some of the winter months), and the average relative humidity 75 per cent (which is rarely exceeded), each cubic foot of air would contain about 5.1 grains of vapor of water. The amount of water taken into the lungs by respiration during a day under these conditions would be 1,785 grains, while the amount exhaled, 6,636 grains, shows an excess of water given off from the system through respiration over that received amounting to 4,851 grains daily. The excess becomes greater as the temperature goes lower and less as it rises, while the per cent of moisture remains constant. To furnish the complement of water between the amount inhaled and that exhaled causes rapid evaporation to take place from the lining mucous membrane of the air passages and air cells of the lungs where such weather prevails. The fluids from the pulmonary circulation which normally keep the lining membrane of the lungs moist contain more or less of the non-volatile

*Human Physiology, Dalton, 1882, page 239.

salts carried in solution of the blood.* These salts are left as a deposit from the water carried out of the lungs during respiration in quantities depending upon the amount of salts in the blood at the time and the extent of the evaportion which takes place. Simple physical deductions give these conclusions, but they have been substantiated by analysis.† In this connection we have the established fact that albumen will not pass through an animal membrane toward pure water, while it will pass to a solution of salt, and that the more rapid the movement of the fluid the greater is the amount of albumen which passes through to the salt solution.‡ This being the case, it results, when there is a deposit of salt on the mucous lining of the lungs, that the exudation of albumen into the air passages and air cells of the lungs takes place. Such I am inclined to believe are the exciting causes of pulmonary diseases, as they are favorable for the lodgment of the germs to which most of the diseases of the respiratory system are due, and it may yet be established that the lodgment and growth of these germs depend upon the extent of these conditions in the lungs.

In my studies of the relation of sudden changes and abnormal departures in temperature to the several diseases, from records in some instances covering twenty years, I have obtained some interesting results. From the diseases that I have studied separately, which embrace more than 125, the following give the greatest number of deaths, and also show a decided increase or decrease in mortality with certain temperature conditions with which we come in contact every day. Deaths from pulmonary phthisis are 25 per cent less on days with minus, and 38 per cent greater on days with plus changes in temperature than on days with stationary temperature, and are 33 per cent and 20 per cent greater respectively on days with abnormally high and abnormally low temperature than on days with normal temperature. The greatest number of deaths from this disease

*The Causation of Pneumonia, by Dr. H. B. Baker, Lansing, Mich., 1888.
†Medico-Chirurgical Transactions, Vol. XXXV, London, Eng., 1852.
‡Dr. Felix Hoppe, Virchows Archiv., Vol. IX, 1856, pp. 245-268.

always follows the occurrence of the lowest temperature. Deaths from pneumonia are 75 per cent greater with any decided change in temperature than with stationary temperature, and are 44 per cent and 78 per cent greater respectively on days with abnormally high and abnormally low temperature than on days with normal temperature. Bronchitis gives a slight increase in deaths on days with minus changes in temperature, and they are 67 per cent and 117 per cent greater respectively on days with abnormally high and abnormally low temperature than on days with normal temperature. Deaths from congestion of the lungs are 86 per cent greater on days with abnormally low temperature than on days with normal and abnormally high temperature, and are 43 per cent and 79 per cent greater respectively on days with decided fall in temperature and decided rise in temperature than on days with stationary temperature. Deaths from membranous croup are 166 per cent greater with either decided rise or decided fall in temperature than on days with stationary temperature, and are 200 per cent greater with any abnormal temperature than on days with normal temperature. In all diseases of the circulatory system quite a similarity is found in their relations to temperature conditions; deaths are 100 per cent and 55 per cent greater respectively with sudden rises and sudden falls in temperature than on days with stationary temperature, and they are 10 per cent greater on days with abnormally high temperature and 10 per cent less on days with abnormally low temperature than on days with normal temperature. Deaths from diseases of the blood are 50 per cent greater on days with a decided rise in temperature and 30 per cent less on days with a decided fall in temperature than on days with stationary temperature, and are 50 per cent greater on days with abnormally high temperature than on days with normal or abnormally low temperature. From diarrhœal diseases deaths are 52 per cent greater on days with a decided rise in temperature and 40 per cent less on days with a decided fall in temperature than on days with stationary temperature, and are 25 per cent and 10 per cent greater respectively on days with

abnormally high and abnormally low temperature than on days with normal temperature. From diseases of the kidneys deaths are less frequent on days with rising temperature and on days with abnormally high temperature than on days with stationary temperature and on days with normal temperature, and are 158 per cent greater on days with a decided fall in temperature than on days with stationary temperature, and are 80 per cent greater on days with abnormally low temperature than on days with normal temperature. Deaths from diseases of the nervous system are 30 per cent and 18 per cent greater respectively on days with a decided rise and on days with a decided fall in temperature than on days with stationary temperature, and are 52 per cent greater and 30 per cent less respectively on days with abnormally high and on days with abnormally low temperature than on days with normal temperature. Deaths from typhoid fever are 38 per cent greater and 10 per cent less respectively on days with a decided rise and on days with decided fall in temperature than on days with stationary temperature, and are 28 per cent greater and 25 per cent less respectively on days with abnormally high temperature and on days with abnormally low temperature than on days with normal temperature. From malarial diseases deaths are 40 per cent and 10 per cent greater respectively on days with decided rise, and on days with decided fall in temperature than on days with stationary temperature, and are 30 per cent greater on days with abnormally high temperature and 30 per cent less on days with abnormally low temperature than on days with normal temperature. Deaths from diphtheria are 75 per cent and 135 per cent greater respectively on days with a decided rise in temperature and on days with a decided fall in temperature than on days with stationary temperature, and are 150 per cent and 68 per cent greater respectively on days with abnormally high temperature and on days with abnormally low temperature than on days with normal temperature. Deaths from old age are 50 per cent greater on days with plus changes in temperature than on days with minus changes in temperature

and on days with stationary temperature and are 30 per cent greater on days with abnormally high temperature than on days with either normal or abnormally low temperature.

The following plate (Exhibit A) represents in a graphic manner the per cent greater or less deaths from some of the most frequent causes are on days with certain changes and conditions in temperature than on days with stationary temperature and on days with normal temperature:

The figures below show what per cent greater or less the daily deaths are from the diseases named, with temperature conditions specified than with stationary temperature and normal temperature.

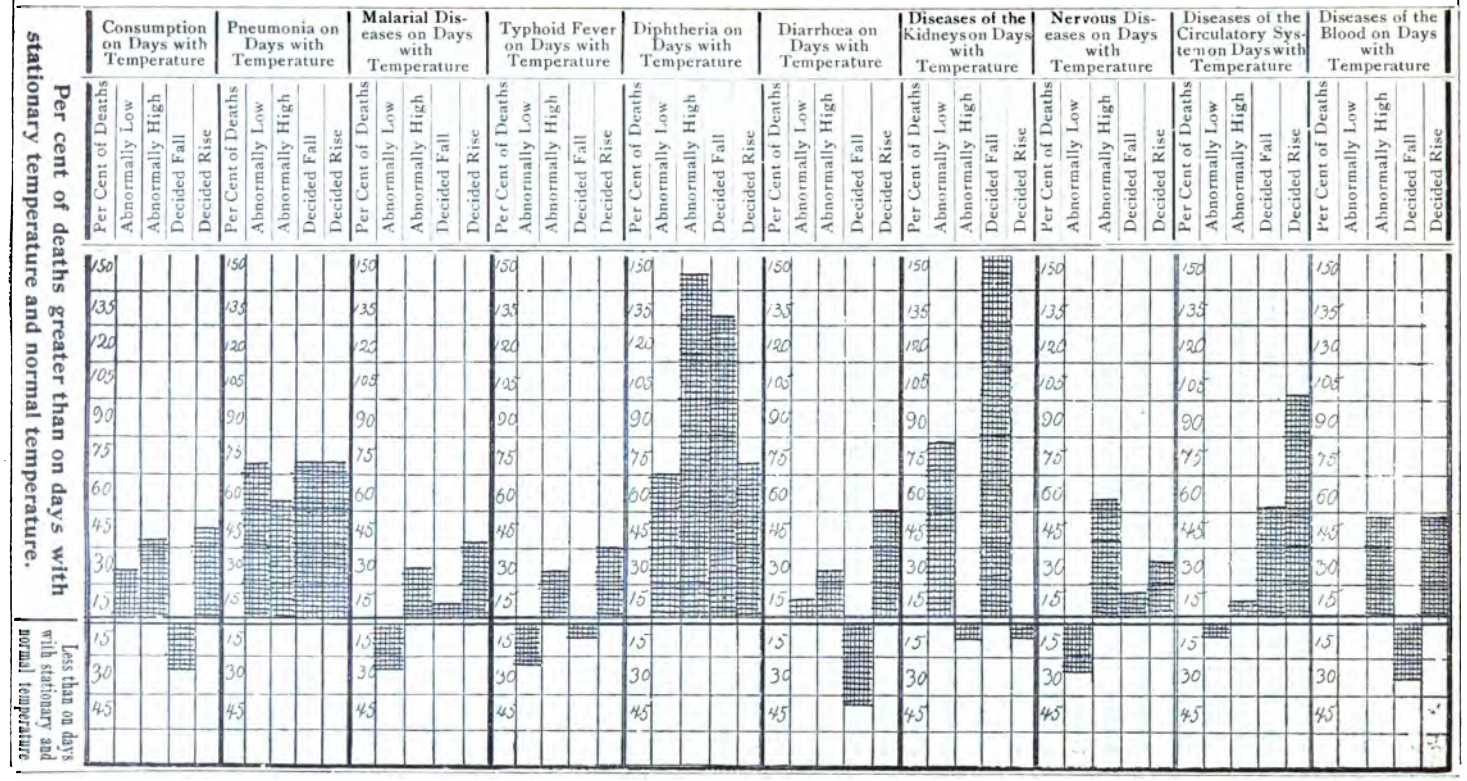


EXHIBIT "A."

In considering the physical effects produced on the organism by the more important climatic conditions, and the known relationships between climatic conditions and diseases, I have divided climates into three general classes, viz: Low, damp, cold climates; low, damp, warm climates; and high, dry climates; with intermediate grades. These features of climate are determined by latitude, proximity to large bodies of water and altitude.

A low, damp, cold climate is one where the altitude is small and of relatively high latitude, the temperature in winter is comparatively low, and the per cent of moisture (saturation) is relatively great. On account of the low temperature in winter the amount of vapor of water present is small, which causes excessive evaporation from the mucous lining of the lungs as a result of the increased temperature of the air during respiration. The relative humidity being high, no evaporation of consequence takes place from external surfaces. The winds are generally continental and give an atmosphere containing more or less impurities. Sudden changes and abnormal departures in temperature are either more frequent or of greater effect in this character of climate than in the others. The diurnal range in temperature is generally great, and the conduction of heat from the body through the moisture medium, particularly during the warm season, is marked and adds to the effects of the temperature changes, and the differences between sun and shade temperatures reach their maximum. These conditions tend to cause certain diseases and to increase the fatality of the others. The excessive evaporation from the mucous lining of the air passages and air cells of the lungs, with very limited external evaporation as a result of the low winter temperature and high relative humidity of this climate, combined with the sudden changes and abnormal departures in temperature, give the conditions which cause or favor the causes of diseases of the respiratory system, and consequently we find pulmonary phthisis, pneumonia, congestion of the lungs, pleuritis, bronchitis and asthma more frequent in this climate than the others.

Diseases of the kidneys are frequent in this climate. This is due to the high degree of saturation with vapor of water constantly present, and also to the frequency of sudden falls in temperature, all of which reduce the amount of water and organic matter eliminated through the skin, the former constantly and the latter spasmodically, and hence increase the elimination through the kidneys. It can hardly be claimed that typhoid fever is caused by climatic conditions; yet these conditions either favor or prevent the development of the germ of the disease, and its fatality is increased or diminished by climatic changes. It is a summer disease, occurs at a season of the year when decided changes in temperature are more frequently rises, and abnormal departures are more frequently excesses, either of which conditions are unfavorable to recovery from this disease, and also favor germ development. The decided rises in temperature in this climate are conducive to diseases of the blood, as mortality from causes of this character is least on days with stationary and minus changes in temperature, and is greatest on days with rises in temperature and on those with abnormally high temperature. Diseases of the circulatory system are always greatest where the most frequent decided changes in temperature occur, which is in low, damp, cold climates. Diarrhœal diseases are almost confined to the summer, and are most frequent in this climate on account of the extreme changes in temperature experienced that derange the functions and bring about more or less congestion, which is a factor in causing these diseases. Nervous diseases are frequent in this climate as a result of the sudden changes in temperature and the diurnal range which excite the nerve centers. Diphtheria is a cold weather disease, and is most frequent in this character of climate. Malarial diseases are almost exclusively confined to the intermediate between the low, damp, cold and low, damp, warm climates. The differences in temperature experienced in summer under the conditions which exist in this climate cause congestion and interrupt the blood in the proper performance of its function and causes fever. It is my

opinion that the micro-organism found in connection with this disease is caused by the effects of these climatic conditions on the circulation. Old age suffers under this climate on account of the sudden changes, which it bears poorly. The impaired vigor of circulation, assimilation and excretion which characterize advanced years, and the special maladies most frequent at that time of life, such as rheumatism, cardiac disease and renal affections, are all augmented by this kind of climate. The diurnal changes in temperature are unfavorable to the aged.

Low, damp, warm climates are those where the altitude is small, and sub-tropical and marine influences tend to keep the temperature uniform and cause it to remain comparatively high throughout the year, and there is a constant large per cent of humidity (which, with the high temperature, means a large amount of vapor of water.) Sudden changes in temperature are infrequent, and the range between day and night and sun and shade temperatures is small. In this climate the evaporation which takes place from external surfaces is small, the same as in the preceding climate, but as the temperature is high and the amount of vapor of water large, the increase in the temperature of the air taken into the lungs is small, and consequently the increase in its capacity for moisture is small. The evaporation from the mucous lining of the lungs is small. The residue of salts and the conditions favorable to the exudation of albumen are all lessoned where the temperature during the greater part of the year is not far below that of the body and the per cent of moisture is constantly great. This climate may have either prevailing oceanic or continental winds, and much of its sanitary characteristics depends on these. The meteorological features of such climates, while they may have many characteristics in common, some of the most important are determined by the prevailing winds and latitude. Here the atmosphere is charged to a greater or less extent, depending upon the amount of oceanic winds, with chlorine and saline matters, which act in the capacity of strong antiseptics and disinfectants. As regards the physiological action of sea air upon the

healthy organism, the marine climate is usually tonic tending to promote the processes of nutrition and assimilation, and is at the same time sedative in character. This is the most exhilerating of all climates, as it gives a small mortality from nearly all the most frequent diseases. The climate aggravates some diseases, but is generally prophylactic. It is unfavorable to those suffering with diseases of the kidneys, on account of the large amount of moisture constantly present, which throws the increased elimination of water and organic matter upon these organs. It, however, possesses advantages over the low, damp, cold climate on account of the less frequency of decided changes and abnormal departures in temperature. The conditions which prevail in this climate may be summed up as, in a great measure, preventive in its effects upon the diseases of the digestive organs, particularly when the trouble is with the stomach and bowels, but where the liver is involved its effects are unfavorable, and its tendency is to cause diseases of this type. Cutaneous diseases are excited by the large amount of moisture charged with irritating salts. Most cases of rheumatism are benefitted, except when of an inflammatory character. Pulmonary phthisis and other diseases of the respiratory system are not aggravated, and as a general rule the small temperature changes and other climatic conditions are favorable to their treatment. The antiseptic effects of the chlorine is a potent factor particularly in phthisis. The generalizations reached by Drs. Bowditch, Buchanan and others, to the effect that pulmonary phthisis is most frequent in low, damp localities, will not apply to this character of climate, for here we find a relatively small mortality from this disease, only about half what the average, as given by the best authorities, is for the world.* This climate is beneficial to those who are debilitated from overwork or long continued strain, apart from actual illness. The equable and bracing conditions are very favorable to young and growing children, and promote healthy and normal physiological devel-

*Flint, Practice of Medicine, Vol. VI, p. 195, gives the average deaths from this disease for the world one-seventh of all, while here it is one-fourteenth.

opment. The equable and moderate warmth of this climate, combined with its sedative influences and its properties of stimulating tissue change and the riddance of morbid deposits, make it very favorable for the aged, and life is prolonged under such a climate far beyond the average. I have found in my investigations that the number of people who die at advanced ages in different climates is greatest in this character of climate. The conditions of this climate are such as give the greatest vigor of circulation, assimilation and excretion, which the aged so much need, and at the same time benefit the young.

High, dry climates are those of considerable elevation, and on account of the elevation are comparatively cold, particularly at certain seasons. Prof. Dr. J. Hann has determined that one-half of the aqueous vapor of the earth's atmosphere* is below an elevation of 6,000 feet, and eight-tenths is below an elevation of 10,000 feet. The per cent of saturation is small; constant evaporation takes place from the external surfaces of the body, and a large amount of the non-volatile salts, as well as organic matter in the system, are carried away through the skin. This leaves the amount of salts which may be deposited on the mucous lining of the lungs considerably reduced; and besides this, even with low temperature at high elevations, the internal evaporation caused by the increase in the temperature of the air inhaled is not great, because of the decreased capacity of the atmosphere for moisture in elevated regions, as already cited. The organs of the body at high elevations adapt themselves to the conditions which surround them, and the capacity of the air inhaled for moisture is the same for the same temperature in the lungs as externally. Very little evaporation takes place from the lining membrane of the lungs; consequently there is very little, if any deposit of the non-volatile salts in the lungs—first, because of the excessive evaporation from external surfaces, and second, on account of the small internal evaporation. At high elevations there is at all times a large proportion of

*Distribution of Aqueous Vapor of the Atmosphere with Increases of Altitude, Zeitschrift Oest. Met. Gessell, 1874, pp. 193-200, IX.

sunshine with its purifying effects. The conduction of heat from the body through the agency of moisture is at a minimum even in the most extreme season. Decided changes in temperature are frequent, and the diurnal range is generally large, but these are not magnified by the conduction of heat from the body as in low, damp cold climates, and consequently the effects are at a minimum for the differences in temperature recorded. These climatic conditions present very few of the features which aid in the development of the diseases of the respiratory system, and is the most favorable climate for their treatment except in cases complicated with nervous troubles, which would receive the greatest benefits in a low, damp, warm climate of the extreme type. Diseases of the nervous system are aggravated by the decided changes in temperature which take place. Diseases of the kidneys are in a great measure prevented by this climate. Inflammatory rheumatism is generally improved. This climate is severe on old age on account of the sudden changes, and also the cold during the winter season, which depresses those in whom the circulation is feeble. This climate develops a quick and nervous disposition in the young. It is unfavorable in cardiac troubles on account of the sudden changes and large diurnal ranges in temperature.

The climatic distribution of the foregoing diseases has been determined from the physical effects produced by certain climatic changes on the different organs and the relation which I have found that the diseases bear to certain weather conditions. In this connection I will state that the distribution of the most frequent diseases in their relation to climatic conditions given here, agrees with the distribution of deaths from these diseases given in the United States census reports.

The following plate (Exhibit B) shows the pathological distribution of climate in the United States as determined from the meterological records of the United States weather bureau on the basis which I have adopted in the study of this subject. This chart shows the different classes of climate in a general manner only, hence it is probable that there are some localities

included in one class of climate which properly belong to others, but on account of the small extent of such localities it is not considered best to attempt anything further than a general subdivision at present. It is believed that this chart will prove of value to a large class of physicians who desire to locate patients in certain classes of climate, but have not the time and opportunity to study out these questions for themselves.

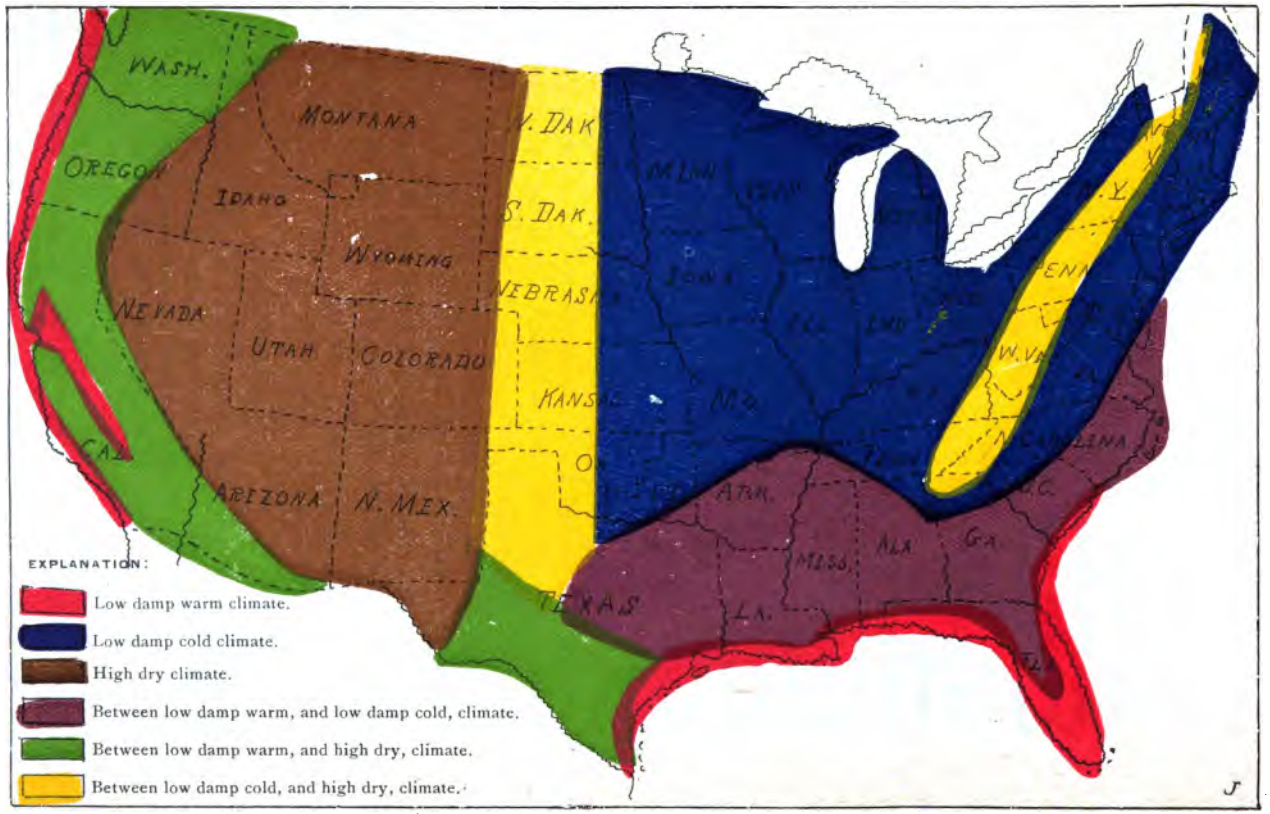
With the middle-aged, when the system is in a normal condition, the organs readily adapt themselves to climatic changes, but with the child and the aged, as well as those who are afflicted, changes of climate should receive careful consideration. Those who are subjected to the conditions of climate which tend to cause disease should use every precaution to counteract the effects by the use of medicines, selected clothing and diet, as well as avoiding unnecessary exposure which is witnessed every day.

Texas presents each of the three conditions of climate in well defined types. The northeastern portion of the state has a low, damp, cold climate, but not so pronounced as that of a large territory to the east and northeast of Texas. The immediate coast region presents the most perfect class of the low, damp, warm climate; temperature changes and departures are slight, and rarely excessive and abnormal. The winds for ten months of the year are, except with occasional interruptions, from the Gulf of Mexico, and are from the same source for more than one-third of the time during the remaining two months of the year. There is a large amount of sunshine throughout this district, notwithstanding the heavy precipitation over the eastern portion. The elevated portion of west Texas is a good type of the high, dry climate, and is a medium of this character of climate, possessing the majority of its most favorable features. All Texas, except the extreme west, has for eight months in the year a south wind from the Gulf of Mexico, which carries coolness and comfort at the very season when coolness is most

EXHIBIT "B."

PATHOLOGICAL DISTRIBUTION OF CLIMATE IN THE UNITED STATES.

I. M. CLINE, M. A., M. D.



needed.* This, as already referred to in connection with the coast district, plays an important part in Texas climate. It gives the coast region one of the most perfect climates in so far as healthfulness is concerned; it makes the northeastern portion of the state one of the mildest of the low, damp, cold climates, and carries its salubrious effects far to the westward over the high, dry climate of that part of the state.

The distribution of diseases in Texas conforms closely with the climatic conditions which influence the causation of disease as discussed in this paper. Certain diseases of the respiratory system, pulmonary, phthisis, pneumonia, pleuritis, bronchitis and asthma, are most frequent over the northeastern portion of the state, and decrease in concentric circles, with the northeast corner of the state as a center toward the gulf and the elevated regions of west Texas. Diseases of the nervous system are most frequent over the northeast portion of the state, are some less over the northwestern portion, and are least frequent over the immediate coast region. Diseases of the kidneys are most frequent over the eastern portion of the state, with a slight decrease southward and a marked decrease toward the west. Diseases of the digestive system are most frequent over the northeastern portion of the state, and decrease toward the south and west. Cardiac troubles are least frequent over the immediate coast section, and are most frequent over the northeastern portion of the state. Malarial diseases are confined to the eastern portion of the state, but are of rare occurrence along the immediate coast.

DISCUSSION.

DR. J. W. MCLAUGHLIN: "The paper is certainly very interesting, and the somewhat definite relations it shows to exist between climatic influences and the prevalence of certain types of disease is very instructive. I wish to ask Dr. Cline where he obtained the data upon which he bases his conclusions."

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*Texan Monsoons, by Prof. Mark W. Harrington, published in Bulletin of the Philosophical Society of Washington. Vol. XII, pp. 293-308.

DR. CLINE: "I have used the United States census reports on mortality in determining the geographical distribution of diseases. I recognize that this character of data is in some respects open to criticism, but I have found that it agrees in the main with the distribution of diseases as determined from the effects of certain weather conditions as found in my investigations in this direction. The relation of daily temperature changes to the cause of disease and deaths has been determined by comparing the daily mortality from each disease with the daily temperature conditions. I have carried these investigations through twenty years' records at Galveston, five years at St. Louis, a few years at Houston and other places in Texas. The amount and character of material used in this part of the investigation is sufficient to give accurate results. I find that the effects of temperature changes are mainly the same under different climates. The changes and departures in temperature selected as a basis are arbitrary, and are the ones which it is believed will give the best results. The daily deaths from the different diseases have been studied separately for days with stationary temperature (less than 4 degrees change), days with changes of 4 degrees to 9 degrees rising, or 4 degrees to 9 degrees falling, and for changes of 10 degrees or more rising, or 10 degrees or more falling. Days with abnormally high and abnormally low temperature are those on which the daily mean is 8 degrees or more above or below the normal for that day, also where there has been a daily excess or deficiency in temperature of 5 degrees or more extending through a period of four or more days, while less departures have been treated as normal, and the daily deaths have been studied for each of these three conditions in addition to the different daily changes mentioned above. The daily deaths from diseases which are to a great extent confined to certain seasons of the year have been considered in connection with daily temperature conditions only for the period of the year in which the deaths occur."

DR. MCLAUGHLIN: "There is one matter—one climatic influence—which seems to have been overlooked in Dr. Cline's paper, to which I am inclined to attribute important therapeutic power. I refer to the influence of altitude, especially upon chronic diseases of the lungs and heart. The amount of energy the heart must expend in its physiological function of circulating the blood will vary inversely and *pari passu* with the atmospheric weight (pressure) on the body of the individual at the time. As one ascends a mountain the atmospheric pressure on his body becomes less, and less energy of the heart is required to circulate the blood; in other words, the heart is relieved of a portion of its work, and consequently the blood is sent with greater force, and better reaches and nourishes those parts of the lungs that

normally are imperfectly supplied—those parts of the lungs where tubercles are most apt to develop. It will not, however, do to push the remedy—altitude—too far, or hemorrhage from the lungs—even in those who are well—may result. Judgment must be exercised in selecting for a patient—say a case of pulmonary tuberculosis—that degree of altitude that will enable the heart to supply blood to every portion of the lungs without over-distending the blood vessels and thereby endangering their rupture."

DR. H. A. WEST: "I feel like offering a vote of thanks to Dr. Cline for this exceedingly interesting and important paper; especially as it is upon a subject which has received comparatively so little attention. There is one point particularly I would like more information on, and that is as to the causes of the frequency of kidney diseases in these low, damp climates, and whether in the doctor's observation of the statistics that fact has been brought to his attention. It has come under my observation as a practitioner, both in private and hospital practice, to observe the extensive prevalence of kidney disease in Galveston and the southern coast country. Whether we have more Bright's disease there than in any other section of the country I can not say; but as to the excessive prevalence of chronic disease of the kidneys in the climate of which Galveston is the center, is certain. Now, why this should be the case where the conditions favoring the activity of the skin, and in this way, we would suppose, relieve to that extent the work of the kidneys, is a problem. There is one factor which is suggested to me, and that is the probability, that in localities where there is an extraordinary activity of the skin, in consequence of which the urine becomes more concentrated, it is possible that the urine being of high specific gravity may act as an irritant upon the epithileum of the kidneys, and in this way produce degeneration and inflammatory changes, and I want to ask Dr. Cline if he has extended his observations in this direction, and whether he has observed any increased mortality rate from kidney disease from such causes."

DR. WILLIAMS, of Oak Cliff: "While I may not be a competent judge of such a paper, I wish to say I consider this one of the most important subjects that will be brought before the association, and I hope, in the interest of the physicians of the state, that the doctor will have a reprint of his paper and distribute it broadcast. There is one thing that would possibly aid us in reaching definite conclusions as to this climatic influence, and that is in the effect of diet, which should also be considered in connection with climatic influences."

DR. CLINE: "As regards diseases of the kidneys it appears that any condition which increases the amount of water, organic matter and salts

eliminated through these organs, has a tendency to cause disease; while any condition which reduces the quantity of these tends to prevent disease. The amount of water given off by perspiration and taken up in cutaneous evaporation, varies in different climates, and while the amount of organic matter and salts in this is relatively very small, yet in the course of a day the amount becomes a matter deserving of more attention than it generally receives, for there can be no doubt that it becomes quite a factor in some climates and under certain climatic conditions. In damp or cold climates very little evaporation takes place from the skin, and the water and its ingredients are mostly eliminated through the kidneys. In low, damp climates the relative humidity is generally high, often averaging 75 per cent. A great portion of the southeastern part of the United States has a relative humidity ranging from 70 to 75 per cent. This condition leaves the water, etc., which would be, in a great measure, eliminated through perspiration and cutaneous evaporation in dry climates, to be eliminated through the kidneys, which requires increased activity on their part, and is a cause for disease. I have found that a sudden fall in temperature always increases the fatality from diseases of the kidneys, while a rise in temperature is accompanied by a decrease in the mortality from these diseases. With a fall in temperature the capacity of the atmosphere for aqueous vapor is lessened and cutaneous evaporation is checked, while with a rise in temperature the capacity of the atmosphere for moisture is increased, and the amount of water, etc., taken up from the skin becomes greater. From my investigations it appears that diseases of the kidneys will be greater or less in proportion as the relative humidity of the atmosphere is great or small, and also with an increase or decrease in the frequency of decided falls in temperature. (In this connection see plate "Exhibit A" with paper, and also page 101.)"

DYSENTERY.*

L. ASHTON, M. D.

DALLAS.

Acute dysentery, because of its frequency, painfulness and fatality has occupied a large share of the attention of medical men since the days of Hippocrates, and for my purpose I will embrace under the designation of "Acute Dysentery" all the various forms of acute alvine flux, in which tenesmus with muco-sanguinolent discharges is a prominent symptom. Tenesmus arises whenever the inflammation of the mucous membrane, upon which the flux depends, affects the descending colon and rectum with sufficient intensity to make the expulsive efforts painful.

Dysentery is one of the four great epidemic diseases of the world, and in the tropics destroys more people than cholera. The fatality of this disease in the Union army in the Chickahominy swamps during McClellan's campaign, according to Woodward, was more fatal than all other diseases put together. While especially severe in the tropics, sporadic cases constantly occur in more temperate climates, and under favoring conditions epidemics are found even in more nothern countries, such as Russia and Canada. In the southern cities of this country dysentery is very common even when not epidemic. Epidemics of dysentery are not infrequent in the United States; perhaps the most severe were those which prevailed in various localities from 1848 to 1856. During the late civil war the disease prevailed to an alarming extent in both armies.

The census reports since 1870 show a progressive decrease in

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*NOTE.—The paper read by Dr. H. A. West, of Galveston, upon "The Treatment of Dysentery," preceding this, being a portion of an article prepared for publication elsewhere, is left out of these proceedings.

the number of deaths from this disease. According to all observers, it prevails most extensively in the summer and autumn. It is well established of dysentery that it occurs for the most part in the hottest season of the year.

Of 546 epidemics tabulated by Hirsch, 404 prevailed in summer and fall, 113 in the fall and winter, fifteen in the spring and summer and only thirteen in winter. Fourteen-fifteenths of the whole number of epidemics occurred in the months of June to November, and it is corroborative of this conclusion that of 1500 deaths from dysentery in the cities Boston, New York, Philadelphia and Baltimore, in eleven years, 1100 occurred in the months of July, August and September. The census reports 1880–90 of our country show the maximum mortality in August and September and the minimum in January and February. Sudden changes in temperature appear more harmful than variations in moisture. The prevalence of unusual heat may call out an epidemic in places where the disease usually shows itself in epidemic or sporadic form, as evidenced by the severe epidemic of 1540, which appeared in England, and which was preceded by a heat so intense as to dry up the small streams and wells, in consequence of which many cattle died of thirst. That dysenteric affections are more frequent in malarial localities has long been known, and is probably connected with external conditions favoring their development. With reference to drinking water, there can be no doubt that the effect of dissolving mineral matters play an important part, and dysentery is always prevalent in districts where wells are low. Perhaps this may be a water-born disease, as is malaria, that is, as is claimed for malaria. From the days of the Greek physicians it has been held that the impurities in the stagnant water of marshes and ponds may give rise to diarrhœa and dysentery. It is probably not vegetable impurities which are directly causative, but the organic matter contained therein.

To sum up the etiology of dysentery in a few words, it may be said that few chapters in medicine are so thoroughly unsatisfactory as to the prospect of reconciling the accumulated dis-

cordant facts. It is very discouraging, because of the singular uniformity of the symptoms, and because the temptation is strong to look for a common cause, and ascribe all cases to this cause, explaining differences by degree rather than by kind. Such a view found solid support in the assumption of a specific germ—the amœba coli discovered by Losch, or the amœba dysenteri of Councilman and Lafleur. That this is one of the chief causes of dysentery can not now be denied, nor does the adoption of this view exclude the possibility of producing catarrhal cases by many kinds of noxious germs, including those of common putrification.

Hot air and wet air are notorious bearers and breeders of germs, and by the law of gravity keeps them near the surface of the earth, conditions which coincide with the prevalence of the disease in the tropics, and among individuals who sleep in the open air or on the ground.

In the past two years there have been so many descriptions of the amœba with reports of cases, that I do not deem it necessary to occupy your time with description, and having now dwelt so long on the etiology of dysentery, we pass over that part of it which is so familiar to you all—the morbid anatomy—and come to the treatment of this grave affection.

TREATMENT.

That there are slight grades of dysentery and that the systems of many are able to throw off this disease in the sporadic form there can be no doubt, as shown by Flint where he stated, as he does, "It is a self-limited disease, which runs its course in from eight to ten days."

When called to a case early it should be the duty of the medical attendant to see that his patient is placed in the position of most thorough quiet, and one conducive to rest of body and mind. Calomel, followed by a saline purge, should be given, as the free, watery evacuations produced by a dose of salts cleanse the large bowels with the least possible irritation, and if necessary in the course of the disease may be repeated. Purgatives,

as a rule, are to be avoided. The important thing to do is to early render the bowels as thoroughly aseptic as it is possible to do. The question is: How is this to be accomplished and still not injure your patient? How to destroy the germs that have already lodged in the mucosa, and produced ulcers, and perhaps necrosis? In my hands this is best done by salicine, salol, sodum salicylate, peroxide of hydrogen, given in the form of glycozone, in teaspoonful doses often repeated; because of the ozone in this preparation it commends itself especially to my judgment. It should be administered in a wineglassful of water. It is entirely harmless.

Salol with bismuth or salicylate of bismuth have often rendered me good service. Opium is an invaluable remedy for the relief of the pain and to quiet the peristalsis. It should be given as morphine—hypodermically—according to the needs of the case.

The treatment of dysentery by topical applications is by far the most rational plan, and a suppository of cocaine and belladonna should always precede the irrigation of the colon, as thereby the irritation of the anus and rectum is overcome, and the tenesmus greatly lessened. Then, with a long tube, the solution selected can be allowed to flow in slowly and thoroughly distend the gut, which should hold from four to six imperial pints. The patient should be in the dorsal position, with the hips raised high enough to get the effect of gravity. It should be borne in mind that enemata can be made to pass through the ileocecal valve, and that with patience and care we can apply our antiseptic or sedative to every portion of the large bowel.

Dr. Ricketts, of Cincinnati, has recently described a tube for rectal alimentation which will be of great service in either rectal or colon feeding, or in irrigating the bowels. I have generally used a large tube or catheter, inserting it from eight to twelve inches. The irrigating injection should be a large one, which will reach all parts of the colon. This plan, which was adopted by Hare of Edinburgh, is highly recommended by H. C. Wood and others.

In this connection I find that an injection of quinine in the early stages is more potent than any other, because of its well-known destructive power of the amœba wherever it comes in contact with it, and, secondly, by its absorption from the bowels. Its specific effect in all cases complicated by malaria are as well obtained as though administered by the mouth. To begin, it is well not to use more than two or three pints of the quinine solution, and to have this warm, and to allow it to run in slowly. The strength of the solution should be one to 1000, or one to 500.

Sodium salicylate injections are also useful in the strength of two to four per cent, and peroxide of hydrogen in from ten to twenty-five per cent solution.

After the acute symptoms subside, astringent injections may be used, and appear to do good, such as nitrate of silver, copper, zinc and alum. Of these my preference is for alum in proportion of a teaspoonful to a pint of hot or cold water. I have rarely seen good results from the nitrate of silver, except in the chronic stage. If it is used it should be in from twenty to thirty grains to the pint of water, and from four to six pints at a time to insure its reaching all parts of the colon.

DISCUSSION.

DR. SAM BURROUGHS: "I was not aware of the fact that I was to lead the discussion on Dr. West's paper until the last evening, and I shall only make a few remarks regarding my experience in the treatment of dysentery in its acute form. Where I am now located we rarely have epidemic occurrences of this affection. In regard to the treatment of dysentery, like all diseases affecting the human body, it is certainly essential we should know something, or, at least, as much as we can know, touching the pathology of the disease, since it will be admitted that our preconceived ideas on this point, coupled with the special form in which the malady presents itself, will, to a greater or less extent, determine our line of treatment. The treatment would, in like manner, demand adjustment in any complication present, or arising in the course of the disease. In malarial districts, for example, and such a district I live in, anti-malarial remedies would have

to be added to any special treatment to attain success. As to the remedies brought forward in Dr. West's paper, and, by the way, I regard it as a most excellent paper, many of them I have never seen tried, and can not from experience speak. My own treatment for the acute form of this disease, uncomplicated, and that which has borne me out safely, as I regard it, for the past ten years, has been to thoroughly evacuate the bowels with Epsom salts, and if this did not suffice, to then put the patient on the following prescription, the remedies being adjusted to the age and condition of the sufferer:

℞

Morphia Sulph .....grs. iv.
Acid carbolic, pure.....gtt. xvi.
Aqua Menth. Pp.....fl. ℥ii.

Mix. Ft. Sol. Sig: Teaspoonful in water every three, four or six hours, as may be required, in order to control tormina and tenesmus.

"If this does not effect relief I repeat the course. But I must say that I rarely have this to do. If malaria is involved in the attack, I use calomel in one-fourth grain doses, repeated every half hour or hour until four or five characteristic discharges shall have been procured, and in addition to the morphine and carbolic acid solution, use qinia. If I fail to detect the pressure of malaria, then I chiefly rely upon Epsom salts as an evacuant. Doses of one-fourth grain calomel triturates have served me better than any other. Occasionally I have used a combination of bismuth and salol. I make my prescriptions so as to contain about two and one-half to five grains each of bismuth and salol. To this prescription I have also, occasionally, added one-eighth, one-fourth or one-half grain of morphia sulph., as may be demanded, but I have chiefly relied on the morphine and carbolic acid solution for relief of the tormina and tenesmus, and in many cases, when seen in their first stage, I use no other medication. I have never used the ipecac treatment. These remarks are addressed exclusively to the acute form of the malady under discussion. I am prepared to indorse the opium treatment mentioned in Dr. West's paper. I did not hear Dr. Ashton's paper; hence can not discuss any of its points."

DR. J. M. KELLAR, of Hot Springs, Ark: "The papers read by Drs. West and Ashton and the discussions which have followed have been so very exhaustive that I feel there is but little left for me to add; surely nothing as to the etiology and pathology, and indeed the paper has about covered all the known or asserted remedies, and I can only in a brief, plain way state my experience with one or two remedies in the treatment of the disease. More than forty years ago my first encounter

with dysentery occurred, and since then almost every year has brought it under my observation, and after so long a time I have been forced to the conclusion that the simplest remedies are the best. Indeed, that a very few of the simplest remedies have given me entire satisfaction in all cases uncomplicated with other serious troubles. And I will be pardoned if, without going into the rationale or the hows and whys, I simply say that I have found that a mixture of Aromat. Sulph. acid and a saturated solution of the sulphate of magnesia in the proportion of one-sixteenth of the former to fifteen-sixteenths of the latter, or to be plainer, one-half ounce of the acid to seven and one-half ounces of the saturated solution of the salts in most cases suffice to effect a cure. Of this, my plan has been, to give from half an ounce to an ounce every hour until copious actions are obtained, and then give opium in sufficient doses to induce sleep and rest for eight or ten hours. If, after such rest and sleep the dysenteric discharges recur, I resort at once to the saline and acid mixture and push it to active copious purgation again, and my experience has been, not only that the patient grows stronger after each action thus produced, but seldom have I known the dysenteric tendency to recur after.

Of course when malarial or other complications exist, they should be met with such remedies as will best combat them. As to the ipecac treatment referred to by some gentleman, I believe it was stated that it was given with a view to its relaxing and nauseating effects. I have been in the habit whenever I gave the ipecac in this trouble to prepare the patient's stomach by abstinence from all fluids, and often by a full dose of opium and then administer the ipecac in a thirty or sixty grain dose in the shape of a bolus or in several capsules at once, and enjoin absolute recumbent rest and no liquids or solids for some hours afterward; hoping in this way to prevent all nausea which in such cases would be surely harmful."

DR. T. J. BELL, of Tyler: "I failed to hear either of the papers read by the gentlemen, and therefore can not discuss the papers. But as this discussion has taken a rather specific scope, I will only mention some thoughts in regard to the treatment of dysentery. Dr. Kellar and Dr. York have dwelt particularly upon the treatment with sulphuric acid and sulphate of magnesia. This is a very popular treatment which I have used some, but I want to mention—and as Dr. Kellar stated—if you will pardon me I will make a prescription for you, one which I have used and which perhaps the most of you will say is an old woman's remedy. I treated a case of dysentery just before I left home and dismissed it. It had some very ugly symptoms, although I made but one visit. My usual custom is—I don't know

where I got the idea—to evacuate the bowels with castor oil. I don't mean the old-fashioned tablespoonful and pouring it down the child's throat, whether or no; but have it made into an emulsion. You can give it where you can't give the dose Dr. Kellar speaks of. You would try to use his dose ten times unsuccessfully where you would not fail with this once. Make it with acacia and white sugar, and then flavor with some palatable essence—lemon or peppermint—and you get an emulsion that will act promptly, and half the oil given in that way will act easier than double the quantity plain. My observation is that when you evacuate the bowels with this preparation you have a cessation of the dysentery, and sometimes almost at once and perhaps for all time; at any rate, you will have a cessation, intermission or remission for at least twelve or twenty-four hours. I usually follow this up with an opiate, with bismuth. Give that after evacuating the bowels thoroughly with the emulsion, and that generally puts my patients to sleep in twelve or twenty-four hours. If the dysenteric symptoms reappear after two or three days, I give castor oil emulsion again and evacuate the bowels thoroughly; then if they continue—which they rarely do if you see the case in its early stages—I use opium in some form. I am aware that if this condition runs on for several days, these simple remedies will perhaps relieve none of them. But where the case is seen in its early stage I will say I have in very few instances failed with this treatment. I have also had very good effects from carbolic acid injection; I have used creolin and just boiled (sterilized) water. To render the lower bowel aseptic, sterilized water is as good as anything else, but what I do insist upon as an evacuant is the castor oil emulsion, which is a very pleasant preparation, and a child will take it as he would a lemonade, and I tell you the stomach will retain it as well as anything else. Flavor it with essence of lemon or essence of peppermint, or both."

DR. R. S. GILBERT: "I have been very much entertained indeed by the remarks regarding the treatment of dysentery, and in the main coincide with what the gentlemen have said, but I think they have left one little point untouched, and that is the treatment when the disease assumes the form of what is commonly called 'chronic dysentery.'

"I have known a number of cases that have gone on for months, and sometimes for years, having been treated unsuccessfully, and called chronic dysentery all that time. But when properly understood they had assumed the form of ulceration of the rectum. We get but little or no good in such cases from medicines given by the mouth. When such is the condition, proper local applications to the affected parts will generally relieve the patient promptly. And while we are

in the way of having prescriptions suggested I would state that I have had the best results from the compound tincture of iodine, full strength, applied to the ulcers once a week, and in the interval hot water irrigation three times a day, followed immediately after each irrigation or evacuation of the rectum, with about one ounce of dilute lead water.

℞

Lig. Plumbi Sub. Act ..... ʒi
Tr. opii ..... ℥ss
Aq. Dist. qs ..... qt. i

Mix. Sig: As above directed.

DR. H. A. WEST: "The gentlemen preceding me in the discussion of this question have evidently been considering the treatment of one form of dysentery only, viz: the mildest or catarrhal form. In a study of the natural history of this type of the disease made by the elder Flint some years ago, it was conclusively shown that such cases would recover in from eight to ten days without any treatment whatever. But with diphtheritic epidemic amœbic, and secondary forms, we have a much more formidable disease to contend with. It is of the latter forms that Osler refers when he says that "Dysentery is one of the four great epidemic diseases of the world, destroying more lives in the tropics than cholera, and more fatal to armies than powder and shot." Woodward included these types when he spoke of the various forms of flux appearing among the troops during the late civil war, that "they occurred with more frequency and produced more sickness and mortality than any other disease. Aitken confirms these observations, for he says: "Dysentery has followed the track of all the great armies which have traversed Europe during the Continental wars for the past 200 years. It helped to destroy the British army in Holland in 1748. It decimated the French, Prussian and Austrian armies in 1792. It was the chief cause of death in the ill-fated Walcheren expedition in 1809. It was the most fatal disease in the Peninsula campaign, and disastrous to the British troops in the Crimea in 1854." Surely this is not the disease that Dr. Kellar cures so easily with his sulphate of magnesia and sulphuric acid, or that yields so readily to Dr. Bell's emulsion of castor oil. The truth of the matter is that epidemic or diphtheritic dysentery is a terrible malady, one that calls forth all of our therapeutic powers to combat it, and that is often attended by a mortality rate of from fifty to seventy-five per cent, in spite of everything that can be done. As regards amœbic or tropical dysentery the same can be said; also that it is essentially chronic in its course, and always obstinate and difficult to cure. Ordinary remedies given by the stomach are utterly powerless;

the location and character of the lesions are such that cleanliness and the application of remedies directly to the seat of the disease by means of irrigation through a long tube, or by aid of the rectoscope and artificial light as devised by Dr. Howard A. Kelley, to apply astringent and caustics to the ulcerated surfaces, offers the best prospect of cure. Even these efforts to reach the seat of disease are often fruitless, for the ulcers are frequently sinuous, with but a small visible apperture, but an extensive destruction of tissue beneath the mucosa, which is undermined, and when the slough is cast off, revealing a large ulcerated surface; hence the essential difficulty in reaching and destroying the organisms which are believed to be the cause of the disease. In addition to which this form of dysentery is very likely to be complicated by hepatic abscess, which still further adds to the difficulties of treatment and to the gravity of the prognosis. It appears strange to me that those who have participated in this discussion have not met with any of the severe forms of dysentery. It has been my experience to see quite a number of sporadic cases of the diphtheritic form, which in many instances prove rapidly fatal in spite of any treatment. At the meeting of the Pan-American Medical Congress I reported seven cases of amœbic dysentery occurring in Galveston, previous to which my colleague, Dr. Geo. Dock, had reported quite a number from the same locality. Lately I have had under my care seven other cases. These facts lead me to believe either that amœbic dysentery is of much less frequent occurrence away from the coast, or that its true nature is not generally recognized. My experience in this matter has induced me to suspect the presence of the amœba in every case of so-called chronic diarrhœa or dysentery, and in the majority of cases of hepatic abscess. But I will refrain from elaborating this subject further, as it will receive the attention which its importance deserves, especially to physicians of the south, in a paper which I have had the honor to prepare for the "American System of Medicine," soon to be published by Hy. C. Lea & Co. Before concluding, however, let me briefly refer to a new remedy for amœbic and other forms of chronic dysentery, which I have tried lately in a series of about seven cases. This is chapparro amargosa. The plant has been used as a domestic remedy in southwestern Texas and Mexico, where it grows, for some years in the treatment of intestinal fluxes. My attention was first called to its use by the report of a case of long continued and obstinate attack of chronic dysentery, which was cured by this remedy when all other treatment had proven ineffectual. Dr. R. T. Knox, of Gonzales, was the reporter as well as patient. Since then Dr. J. W. Nixon and others have reported similar good results. Since my attention has been called to this plant I have treated every case of amœbic dysentery with it, giving

two or three drams of the fluid extract every three or four hours, and lately using it also by rectal injection, two ounces to the quart of warm water. The last three cases have been treated exclusively with the chapparro. The results have been good, the improvement was prompt and progressive. Knowing the insidious nature of this disease, and the proneness to relapses, I do not wish to speak too confidently, but in every case under its use the frequency of the stools has diminished, the tormina and tenesums subsided, the blood, mucus and amœba disappeared from the dejections. The patients left the hospital apparently cured after three to four weeks of treatment. Positive conclusions can only be reached after further investigation and trial. We must, however, bear in mind that many cases, especially of the gangrenous variety, are doomed in spite of any remedy that can be used. Before closing, I must take issue with my friend Dr. Ashton as regards the causative influence of dissolved mineral matters contained in drinking water. I am well aware of the fact that such is a prevalent idea, but in my opinion it is a popular as well as important error, for it leaves out of view the real cause, which I believe is the contamination of the water with *infectious organisms;* especially is this the case with epidemic and amœbic forms. In nearly every case of amœbic dysentery coming under my observation, the facts have pointed to infection through the drinking water, and the likelihood of an infected water supply through fecal and other sources of pollution is the explanation of the enormous prevalence of dysentery in camps and armies. I am sorry that I have not time to elaborate this proposition, viz: *that a study of the means to secure a pure water supply in the prevention of the disease we are discussing, is a matter of far more importance than the treatment.*

PHENACETIN AS A TOXIC AGENT.

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GALVESTON.

Phenacetin has such a wide range of usefulness as a remedial agent, that it may not be uninteresting to bear in mind some of the toxic effects which the drug is liable to produce. Notwithstanding the fact that phenacetin (with the exception, perhaps, of phenocoll) seems to be the least poisonous of the coal-tar derivatives, yet, in sufficiently large amounts it may cause serious after effects, and, undoubtedly, death.

With the collaboration of Dr. William S. Carter I have carefully studied the physiological actions of phenacetin in an extended series of experiments upon the lower animals. (I) Dr. Carter and myself did not notice marked untoward symptoms, even when the remedy was administered in comparatively large doses, nor did we observe any particular changes in the character of the blood itself, changes which, according to other investigators, are sometimes produced. Later observations, however, lead me to the belief that phenacetin, especially in large quantities, does cause alarming symptoms, chief among which may be mentioned a markedly disordered circulation, accompanied with symptoms of collapse. These symptoms have been noticed both in the lower animals and in man.

The fact must not be lost sight of that phenacetin may be adulterated with acetanilid, and other substances, and it is possible that to this adulteration may be due some of the poisonous effects attributed to the drug in question, as reported by various writers.

I. *Notes on New Remedies*, September, 1892.

Thus, in a case published not very long ago (I), in which serious symptoms of poisoning were observed, it was found that the powder given as pure phenacetin, consisted really of equal parts of this remedy and acetanilid. Again, Reuter (II) has called attention to the fact that phenacetin contains at times some unconverted paraphenetidin, this latter substance producing, even in small doses, toxic effects, especially nephritis with albuminuria.

But be all this as it may, experimental investigation and clinical evidence have shown that phenacetin *per se* exercises a toxic action, particularly when it is ingested in excessive quantities.

Kinsberg and Kast (III) found that large amounts of phenacetin produced in dogs, irregular gait, rapid respiration, vomiting, somnolence, cyanosis and discoloration of the blood, asserting that this latter phenomenon was due to the conversion of hæmoglobin into methæmoglobin. The same opinion is entertained by Hare (IV) in his able essay. Muscular weakness under the influence of phenacetin, probably due to a spinal action, has been observed by Mahnert (V). Hoppe (VI) has reported a case, that of a student, in whom two grammes (thirty grains) of the drug caused insomnia, weakness, inability to stand, and a slight ptyalism. Hollopeter (VII) records the case of a woman who, having taken about a gramme and a half (twenty-two grains) in the course of six hours, showed the following symptoms: Great dyspnœa, general marked lividity, restlessness, precordial pain, inability to stand, involuntary defecation, dilated pupils, cold perspiration. She finally recovered under the use of ammonia and alcohol. The blueness of the surface of the body, however, lasted for more than three days. For over a week the patient was unable to be around the room, convalescence being very slow. Mah-

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I. *London Lancet*, December 20, 1890.
II. *Pharmaceutis. Zeitung*, March 21,1 890.
III. *Centralbl. f. Gesammt. Therap.*, April, 1887.
IV. *Fever—Its Pathology and Treatment*, 1891.
V. *Deutch. Med. Wochenschrift*, xiv, 1888.
VI. *Therap. Monatschafte*, ii, 1888.
VII. *Medical News*, 1889.

nert (I) has observed urticaria, and Hare (II) has seen large wheals following the use of phenacetin.

Through the courtesy of a brother practitioner (whose name I have been requested to withhold), residing in a prominent city of the state of New York, I am enabled to report the following highly interesting case of phenacetin poisoning, which seems to corroborate much of what has already been stated in regard to the matter:

A healthy mother, who had given birth to two healthy children, which had thriven and are now living, was delivered early in the year (1895) of a child weighing six and one-half pounds, after a two and a half hour labor. The presentation was R. S. P., the legs extended against the front of the body, the placental insertion low and posterior, as diagnosed before labor by the location of the round ligaments, and confirmed by the clean cut hole in the membrane close to the placenta, found after delivery. A large amount of liquor amnii was present. The child was very rapidly expelled by pressure on the fundus; the delivered parts were enveloped at once in flannel, without traction; the flexed arms were slipped out readily; complete flexion of the head was maintained by pressure through the abdomen and on the face, so that no traction was made on the neck (Wigand-Martin method), and the funic pulse was certainly not arrested two minutes up to the time when the mouth was brought to the vulva, swept clean, and the child began to breathe. The head was very slowly shelled out. At no time was much force required; at no time was the child cyanotic, and at no time was there any indication of convulsive movement or attempt at respiration before birth. A good pink color, regular respiration and heart action, were present from the first, so that it is not in the least likely that cerebral or spinal injury, or inhalation pneumonia, could have accounted for the subsequent cyanosis. The child did well until its fifth day, losing less than half a pound. On the fifth day a slight diarrhœa developed, without temperature and without sepsis from the navel, which sloughed off that day. Three-grain bismuth powders three or four times a day were ordered for the diarrhœa. They were in a pink box, which had been used for the other baby, about a year old at this time. On the sixth day four of the powders were given, making seven in all, the diarrhœa ceasing. On the night of the sixth day the baby was very fretful and somewhat weak, and purplish in color. On

I. *Loc. Citat.*
II. *Loc. Citat.*

the seventh day the eyeballs were jaundiced, color dusky, and the child restless, but otherwise her actions were entirely normal, except for some hebitude. The digestion was good, the pulse of fair quality —130 to 140—the temperature in the rectum, respiration and pupils normal; but on the seventh and eighth days the lips and finger nails were black, and the extremest cyanosis was present. On the eighth day Prof. Charles Jewett went over the case carefully, confirmed the statement that the lungs were entirely clear, and found nothing whatever to account for the condition. On this day bloody urine in large quantity was passed. The prognosis was very bad, and the child looked as if it could live but two or three hours at most when seen by Prof. Jewett. Without much hope oxygen was ordered. On the ninth day it was seen that during the night, after about the fourth application of oxygen (ten minutes out of each half hour), that the color had somewhat improved with each administration, and the action was distinctively soothing. The stools of this day became of a coffee color, the temperature 100 2-5° F., and the baby, as always, nursed well.

From this time on the baby had ups and downs, the cyanosis continuing, but never as grave in degree. The case had practically no history, except the cyanosis of varying intensity. The oxygen was efficient for only two days. On the eleventh day the promise was brighter, the child not pink, but the duskiness distinctly less, though from this time on marked jaundice was present, with less color in the urine, anæmia of a very high degree, and pronounced weight loss. The pulse about this time was weak for a couple of days, at no time above 150, and the temperature never above 100 1-5° F. Before the thirtieth day the original weight was regained, and by the fiftieth the anæmia was nearly gone.

Just after the consultation, the physician, author of the foregoing report, found two powder boxes of exactly the same appearance; one labelled "*For baby's diarrhœa—three or four times a day,*" and the other labelled "*For the older child's fever and pain —not over three a day.*" The nurse then found that she had given seven two grain doses of phenacetin, instead of seven three-grain doses of bismuth—on the first day six grains, on the third day eight grains, and that it was on the night subsequent to the last dose in the evening that the cyanosis began.

Somewhat elaborate details concerning the delivery, etc., have been given in order to show that no injury during delivery, or other cause, could explain the condition of the little patient ade-

quately. It was undoubtedly a pure case of phenacetin poisoning.

No comments seem necessary on the above report. It may not be out of place in this instance, however, to recall the observations of Reuter (I) regarding paraphenitidin, which phenacetin sometimes contains as an impurity, and which, it is believed, causes toxic effects even in small quantities. The author just referred to gives the following method for the detection of paraphenitidin in phenacetin: "2.5 grammes (38¾ grains) of chloral hydrate are melted in a small test tube on a water-bath, and 0.5 grammes (7¾ grains) of phenacetin added. Upon shaking, a solution will be formed, and if the phenacetin be absolutely pure the solution will remain colorless for at least five minutes, but after that time will assume a rose-red color. If, however, the paraphenetidin be present, and it be exposed to the same temperature on a water-bath for not more than two or three minutes, the solution becomes colored, according to the quantity of contamination present, into a more or less intensely violet, varying from a red violet to a blue violet."

In conclusion I may be allowed to remark that in cases of poisoning by phenacetin, cardiac and, much more especially, respiratory stimulation by drugs, would be useful. The results obtained in the case herein reported, in which oxygen inhalations seemed to do well, and in that reported by Hollopeter, in which stimulation by amonia and alcohol acted efficiently also, are self-explanatory. In a given case, prolonged artificial respiration as a last resort would seem to be particularly indicated.

DISCUSSION.

DR. WILLIAMS: "I have given phenacetin very frequently and consider it the best of all the coal-tar preparations, the least toxic in its effects, the most certain and one of the most powerful, and hence I consider the subject of the paper a very important one, and espe-

I. *Loc. Citat.;* also *Annual of the Universal Medical Sciences*, 1892.

cially as to this question of the possible contamination of the phenacetin and the necessity of having a pure preparation. I have seen toxic effects from various other coal-tar preparations, those patented, one sold extensively in our town called 'Head Ache Cure.' I have seen several cases poisoned therefrom; also from antikamnia, but this excellent paper teaches me as to the necessity of care in the use of these coal-tar antipyretics and the possibilities of heart failure, especially in such diseases as typhoid fever, in which this remedy is extensively given; also in diphtheria, pneumonia and similar diseases attended by high temperature, in which they are frequently prescribed. The lesson I have learned is to be extremely careful in the use of these coal-tar remedies, because I believe the mortality will be increased from their extensive use, and that it is best to use other and safer methods of reducing fever."

DR. BLAILOCK: "I agree with Dr. West that the paper is an important one, but inasmuch as it admits that phenacetin in the markets is often adulterated or found associated with other coal-tar products, I think it is lacking in scientific exactitude. To attribute to phenacetin results that may be produced by other substances is hardly giving it a fair show. A very poisonous substance, paraphenetidin, is sometimes, owing to imperfect conversion of phenetidin by acetic acid, found present in phenacetin. To detect the presence of this poisonous product is a simple matter. Melt chloral in a test tube; add phenacetin; if pure it remains colorless; if paraphenetidin be present it changes very quickly to a violet color. I have for the past five years used phenacetin almost to the exclusion of all other remedies of this class, and have never seen a bad result from it. I had a patient some years ago whose fever stood at 105° and above, in spite of cold water, ice purgatives, etc. Cold in this case produced goose-skin, livid and purple lips and face, accompanied by a very weak and thready pulse, and at the same time temperature under tongue remained 105° and above. After trying a whole day to reduce temperature in this way I commenced the administration of phenacetin in six grain doses, with a little whiskey every two hours. After a few doses were given fever began to subside, and the patient felt decidedly more comfortable. However, six grains were given every two hours for three whole days, and then every four hours for two days longer, when quinine was substituted and the patient made a good recovery. He is now in good health and a free participant in athletic sports. I think there are very few who have used antifebrin, antipyrin and some other of the coal-tar preparations who have not seen alarming symptoms result, and sometimes fatal prostration. I do not advocate the indiscriminate use of phenacetin, nor do I advise the large doses as given in the

case referred to, because very small doses will often accomplish all we desire; but within certain limits, and those limits are broad, we may use it with comparative impunity. Strychnia is perfectly safe if given in suitable cases and in proper doses, but indiscretion in either dosage or the selection of cases may result disastrously. The same is true of many other remedies that we esteem highly and consider perfectly safe.

THE THERAPEUTICS OF EXERCISE.

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GALVESTON.

This is essentially an age of progress. Scientific discoveries and inventive application of scientific truths mark the present century. No department of knowledge has lagged. All kinds of industries have multiplied, commerce extended, social and political problems solved, individual and national wealth accumulated. Mind dominates matter; muscle yields to brain. Mental labor characterizes the present age; brawn counts for little.

No one appreciates the great good to humanity resulting from the achievements of the Nineteenth century more than I do. Its benefits are so general, so full, and have come so silently, that we must analyze to appreciate them. But the question may be asked: Are these grand achievements of which we boast an unmixed good? Have they not been made at much sacrifice which might have been avoided? Is physical culture worthless, that it should be neglected as now? Can we boast of a superiority over the people of the former century in every thing? Are we their equals in those attributes which go to make the perfect man, and upon which health and happiness, individually and collectively, depend? We live in a luxury of which they never dreamed, but do we sleep as soundly? Do our bodies thrill with the glow of health as did theirs? Are we as quick of eye, as firm of tread, as ready of judgment? While cultivating the intellectual forces are we not planting the seeds of decay? Our ancestors, in the primitive days, had large, expanding lungs, full chests, strong and hard muscles, exhaustless

strength, and knew but little of the aches and pains and ills which are so general with us that we accept them as natural to human life. The higher type of savage was perfect in form, lithe in movement, keen of vision and strong of arm. He knew nothing of the higher culture; he was an animal it is true, but a noble animal. The question I would ask is: "Are we not, in the pursuit of science and wealth and luxury, neglecting our bodies, and is this necessary?" Man is an animal—an intellectual animal, it is true—but the full development of his body is necessary not only for his health, but for his complete mental development. Why the increasing number of the insane, filling our asylums, private and public? Why so many sudden deaths from so called heart trouble? Why the prevalence so general as compared to the first half of the present century of Bright's disease, and, above all, why the increasing statistics of death from consumption? I believe it is mainly due to the neglect of physical culture.

Progress is so rapid, the daily business of life so exacting, competition so great, that we think we have no time to attend to our bodies. Given two men of the same mental gifts and general attributes, that is assiduity, perseverance, ambition, love for his life work; the one strong and healthy, the other feeble and weak; the one sleeping and eating well, the other sleeping badly and not assimilating his food; the one a stranger to aches and pains, the other tormented with neuralgia and constipation, and both engaged in the same mental work, and die at the same age, the work of the former will outstrip in scope and value that of the latter.

Everything intertwines and interlaces every other thing, and every thing, to a certain extent, depends upon every other thing. This law applies more especially to the development of the human being; to be complete he must develop along all the lines. Montaigne has well observed, in speaking of men: "I would have the disposition of his limbs formed at the same time with his mind. It is not a soul, it is not a body we are training, but a man, and we must not divide him."

Physical culture includes exercise. Food and air being sufficient, there is no other way of developing any part of our organism. Exercise means youth, functional vigor, and a high standard of organic life. Muscle will only grow and develop by being exercised. If not used, it wastes and atrophies. It is by the exercise of the skeletal muscles that we can under the will, indirectly, exercise the muscles of the heart and of respiration, of the arteries, and of all movable parts relating especially to the nutrition of the body. The body consists of individual cells, and so long as the vitality of the individual cells is maintained at their normal standard there can be no disease. I am one of those who believe it possible to resist all diseases, in a measure, by close observance of the laws of hygiene. Preventive medicine is forcing itself upon the attention of the physician and the people, and one can not prophesy the miracles it will perform; but the purpose of this paper is to discuss only one feature of hygiene.

We neglect our bodies and cultivate our brain, and what are the results? Cell activity is lowered; we are the prey for every disease that comes along, infectious or otherwise. A current of air often prostrates with catarrh or pneumonia or, perhaps, consumption. We have no power of resistance, therefore no immunity. Herbert Spencer said some twenty years ago that "the enlightened people of this age took an interest in the raising of the offspring of all creatures except themselves."

The law of reactions prevails in every thing, and it is probable that this law will operate a change in the life of the future generations of our country. We already see evidence of this coming reaction. Physical culture, more especially exercise of the skeletal muscles, is engaging the attention of educated men and women, and no doubt will in time bring forth its legitimate fruit. I quote from another in declaring that it was not until 1875 that the English channel was crossed by a swimmer; not until 1877 that a man had ever leaped, without artificial aid, to the height of six feet two inches from the ground. There are men who can now jump across a gap of twenty-three feet in

width. A mile has been run in a few minutes. I do not quote these facts to argue that scientific exercise must result in accomplishing such feats, to be complete. I quote them to show that interest is awakened upon the question of exercise, and it is receiving an attention not heretofore given it. These extraordinary feats have done this much good: they cause thinking people to realize what may be accomplished in developing the human body by systematic training.

The purpose of exercise is not to make giants of pigmies; it can not make a Sampson of a Tom Thumb. There are factors, as hereditary and other factors, that limit the effects of exercise. Exercise, rationally applied, develops the body along all lines into symmetrical proportions. Physical culture is most effective if begun in early childhood. This is the time in human life when the human being is not responsible, but the parents and family physician are. It is then that the body is the most impressible, as well as the mind; it is then that the bent twig may be straightened. The results in the development of the body by systematic exercise begun in childhood with stunted children of stunted parents, as given us through statistics, are wonderful. By reference to Mr. Charles Roberts' Manual of Anthropometry, we learn that: 1. Growth is most rapid during the first five years of life. 2. From birth to the age of five years growth is the same in both sexes. 3. From five to ten years boys grow more rapidly than girls. 4. From ten to fifteen years girls grow more rapidly than boys, and from eleven to fourteen are actually taller, and from twelve to fifteen are actually heavier than boys. 5. From fifteen to twenty years boys again take the lead and grow at first rapidly, then gradually slower, and complete their growth at about twenty-three years of age. After fifteen girls grow very slowly, and attain their full stature at twenty years of age. The statistics show a very slow but steady increase of stature up to fifty years and a rapid increase in weight up to sixty years. Some children appear to grow by fits and starts. Children remaining several years below the medium height may suddenly shoot up and

attain more than the normal stature when they reach adult age. These statistics are valuable as a guide as to the best time in the life of the individual to apply systematic exercise, and further teach us that the time for the most satisfactory results differ in the two sexes. It is during the period of the most rapid growth in stature that most can be done in correcting the deformities of childhood, whether hereditary or acquired. Postpone the systematic exercise of definite parts until adult life, while much may be done, the results are not so marked.

The scientific regulation of exercise, especially during youth, does more than to increase the size and height of the body; body symmetry generally is the result, giving grace and litheness to the movements. Muscular co-ordination is made more perfect. Of all animals the human being is most subject to variations in proportions and symmetry. If we were to take the measurements of the members present in this association I doubt whether one of us would be found of perfect symmetry—the two corresponding halves would not compare alike. This want of symmetry not amounting to a deformity, a systematic course of training, especially during the period of growth, would correct. The long, lanky, graceless lad, whose height has outrun his muscle, may be made to become a well proportioned, graceful man. He needs the systematic exercise of every muscle daily; therefore his trainer, whether physician or parent, must understand how this is to be done. The short, stumpy lad with big head and chest, with legs out of proportion with his trunk, ungainly and unsightly, may be developed into a well proportioned man; yes, may be made to represent the highest type of physical manhood. Here, the legs need exercise more than the muscles of the trunk, and to such case bicycle exercise should be prescribed early in life.

The power of exercise rightly applied to develop deficient parts without increased development of normal parts is remarkable. McClareen gives the case of a lad nineteen years of age whose height was not increased by exercise, but who increased the girth of his chest four and a half inches in nine months. A

more remarkable case is reported by this author, which not only proves that special parts may be exclusively developed, but that such development may be brought about long after the natural period of growth has passed. A man thirty-five years of age, at the end of two months' exercise at the Oxford gymnasium had increased the circumference of his chest no less than four and a half inches.

Exercise of the skeletal muscles tends to expand the lungs and send to the organs and tissues fresh arterial blood more frequently; body metabolism is increased and cell activity strengthened; the heart beat is increased within normal limits, and the system is cleared of waste matters; the sewers of the body act more efficiently. Dr. Lagrange, in his work on body exercise, observes: "Heat causes in muscle fibres the first stage of contraction, or at least an aptitude for coming into action, under the will, more quickly. The heated muscle seems to have stored in a latent force. The maximum aptitude for contraction in human muscle is about 40 degrees C. It is then that a man's muscle can act more quickly and he can make use of all his force." This author compares the preliminary sparring before a fight, the preliminary canter before a race, and the movements of an angry animal before an attack, to the heating up of a locomotive before it starts upon its run. Here we have a practical lesson. In exercising, or prescribing exercise, the greatest effort must not be made at the start. The muscle should be gradually warmed up to its work. A neglect of this precaution will result in the immediate fatigue of the muscle and an abandoning of the prescription. Again, we should understand that as the muscle becomes accustomed to work, its capacity for work increases, and it may be increased daily until it reaches its extreme limit before fatigue.

Skeletal muscle exercise is perhaps the only remedy for obesity. When a man suffering from obesity applies to the physician he puts him upon a special diet, prohibiting all food as he thinks will be transformed into fat during the process of assimilation. This does no good, but will surely do harm.

Such prescriptions, prohibiting nourishing food, if it does anything, deprives the cells of their needed nourishment, weakening their vitality without reducing the obesity. Muscular exercise is the remedy in these cases. The physician should direct and enforce the exercise. These people abhor exercise and must be driven to it with the lash.

Fat is a reserve tissue; it is fuel for the body combustion. It is easily dissimilated, and as it is uncombined with the tissues structurally, only deposited, its removal within limits does no harm. As the obese man loses fat under this regular and systematic exercise, his muscles become firmer and harder and larger; contract more easily under the will. He soon becomes hardened, is not easily fatigued, his chest expands more, the heart beat is less sluggish and the intellect brighter. I quote Dr. Lagrange again, who says: "Exercise produces in the system two absolutely different effects: it increases the power of assimilation, by which the body gains new tissue and accelerates the process of dissimilation, by which certain materials in excess are destroyed." Then exercise is necessary to thin people who assimilate too little and fat people who do not dissimilate enough. Again, general exercise promotes regular evacuations of the bowels, and how important this is to health I need not explain.

The longer I live and investigate matters relating to medicine the less confidence I have in the Materia Medica and the more in preventive therapeutics. Expand the lungs by exercise in the open air, draw in draughts of fresh air, make the blood course more rapidly through the tissues, clear out the waste matters as soon as formed, drink a plenty of pure water, without whisky, bathe regularly, and you may defy disease. But we must remember there can be too much of a good thing. Exercise ought to be willingly performed and should stop short of muscle fatigue, and must be kept up, in a measure, through life. Exercise last year gives no immunity this year, only in so far as it has developed the organism. When muscle is fatigued it responds to the will with difficulty, and exercise to this extent

neutralizes the benefits, if kept short of fatigue. If exercise has the effects I claim, it must have a good effect upon the mind and morals of a man. It improves, of course, the circulation of the blood in the brain and aids all cerebral acts. It stimulates thoughts and ideas. A proper distribution of mental and physical work is the great desideratum. When we do this our system of living is as perfect as we can make it. Says Dr. Lagrange: "Prescribe fencing, gymnastics with apparatus, lessons in riding school to all those idle persons whose brains are languishing for want of work. The effort of will and the work of co-ordination which these exercises demand will give salutory stimulus to the torpid brain cell." But, says he: "For a child overworked, at school, for a person whose nerve centers are congested by persistent and close mental application, prescribe long walks, the easily learned exercises of running; and failing of better, the old game of leap frog, prisoner's base, running games, anything rather than difficult exercises or acrobatic gymnastics." With such persons the mind must entirely relax while the body plays. The same prescription will not apply to all. The prescription for the working man and the hard student must differ. Exercise in the various sports which are now becoming popular will give individual character. It is a good way to cultivate in the boy the qualities which adorns the man, as it gives pluck, courage, endurance; it teaches him to be quick of hand and eye and prompt of judgment. It is a good school for discipline, self-control, self-reliance. The games which are becoming popular in our schools and colleges will in time extend among the people as national games, and if kept in bounds and regulated, will make the future citizens of this republic brainy and muscular, independent and self-reliant, lovers of freedom and ready to battle for it.

I know my paper is lengthening out, but I must refer to the dangers of too much exercise, of excessive exertions and straining. I can only enumerate them, for want of time. First—Breathlessness. In the beginning of exercise it is very easy to pump oneself out of wind. He must avoid this by beginning

mildly and gradually. Second—Muscular fatigue. If you apply an electric current to an exercised muscle it will contract, but if you apply it too long or too strong, it quickly refuses to respond to the strongest stimulus; it must rest to recover its contractility. The same condition may be produced in the living body by too long or too active contractions of muscle under exercise. Too active exercise, even when muscle fatigue is not produced, will be followed by stiffness at least until muscles have hardened and been taught endurance. Third—General fatigue. Overwork is followed by a depression which is often followed by general disturbance and fever, the "fever of over-exertion continuing for days, due, no doubt, to throwing into the system of waste matter more than can be eliminated, and thus acts as a poison. The effects of excessive exercise may be any of the following: The heart may be ruptured; excessive exercise may be followed by hypertrophy of the heart, dilatation of its cavities, or valvular disease. Blood vessels may be ruptured. Aneurism, varicose veins, hernia, hæmoptysis, rupture of muscles and fracture of bones. Such being the case, no prescription requires more judgment and scientific knowledge on the part of the prescriber than exercise of the skeletal muscles. The physician who has no general knowledge of anatomy and physiology is incapable of prescribing the manner and amount of exercise. He must know the relation of each muscle and group of muscles to the bones, and the relation of special organs to special parts and their functional dependence of each upon each; and above all, the relations between voluntary muscular and cerebral action before he is competent to give rational and scientific directions about body exercise. There is an organic pathology and a psychical pathology. Every case of paraplegia of hemiplegia is not due to organic lesions; perhaps oftener they are caused by psychical lesions, so to speak—an abeyance of will power. We must know something about the latter pathology before we can assume to teach the dumb to speak or the lame to walk.

DISCUSSION.

DR. LANDON CARTER GRAY, of New York: "I have listened with a very great deal of pleasure to this very interesting paper. It certainly meets with my approval in most of the conclusions reached by the author. I have appreciated for a great number of years the necessity of exercise in prescribing for my patients, but the difficulty always has been when to know not to prescribe it and how to prescribe it. This paper has given me some new ideas. I started out with a fine set of propositions and then abandoned them and got a set of propositions about rest and abandoned them. I hardly know what I think about it at the present day, because it is simply so very difficult to give sick people exercise scientifically and properly. It is all very well to tell a man who is too fat to get on the back of a bucking broncho and take a ride, but you take the case of one who needs exercise because he is living too much indoors, or because he is too much worried with the cares of a business life, and tell that man to take violent exercise and he will not improve, and you will have a decided failure. Or if you will take a woman whose life is varied with the cares of maternity and frequent child-bearing, and tell her to take violent exercise, and you will have another failure. Or if you take a person who is extremely anaemic or emaciated, who comes to you with a case that is very serious, if you tell that person to take excessive exercise I think you will have another failure. Now I find that I have made all these failures. Then I began to think there was something radically wrong about the theory of exercise or in the application of it. I then went to work and tried rest, the other extreme. I found that gave better results in a large proportion of the cases, but still it did not answer the purpose, because I made failures even with rest. Finally I have been trying of late years to see if I can not get exercise administered scientifically as we do medicine, by stated doses. If you tell a man who needs anything in the way of exercise to get out and take it, it is very much like telling him to go and take a dose of strychnine without giving him a prescription. If you put your man into the average hands of the owner or manager of a gymnasium, you may do still better, but you will find that he may not improve for want of proper care as to the degree of exercise. I also tried massage. I have seen a man seventy years old, who was so weak that he could not walk more than two blocks, made in two or three months so that he could walk fifteen miles a day and leave his son, thirty-four years old, far behind him. I have seen results in massage equal to physical exercise, but there again the trouble comes in that masseurs are very

apt to overdo it. You take the average Turkish rubber and he will use up most any patient you send him. It is all very well to put a masseur to work on an athlete, but it will not do to turn him loose on a sick person. To give massage properly is one of the most difficult tasks I have ever had in my life. So you will see after this long discussion of my experience I really do not know much about the subject. If a patient comes to me I send him to a man that gives massage, and let him do about what I think is the right way, and if the patient improves I let him go on, otherwise not. And then, again, if I have a case come to me which I may recommend to take exercise out of doors, and if such exercise out of doors does good, I let him go on, otherwise stop it. I have no general principle by which I can tell you what patient is going to do well and which is not, though I am positive of this: If you take an over-worked man or woman from his or her profession you had better go very slow with all physical exercise. In other words we should be extremely careful in dealing with this wonderful piece of mechanism, the human body. It has seemed to me to take a tired man or woman and tell them to take more exercise is like taking a boiler in which the steam is low and telling the engineer to make a hole in the boiler and get the steam high. Nevertheless, I find that such a comparison works well. I do not want a person who is tired from overwork to take exercise until they get fully and thoroughly rested. I am in search of information about this myself, and think I have said enough to show that we do not understand the value of the application of what is undoubtedly a very useful principle."

DR. A. H. SCHENCK: "Dr. Clopton's paper has impressed me very forcibly, and in the discussion Dr. Gray has shown us very clearly how exercise can be used for good or evil. In this connection I want to mention an institution that has arisen in many of our towns with other fads, *i. e.*, the gymnasium. It is usually organized and conducted by a genteel pair of strangers, who come from (we know not where) but as a rule from New York. They organize the club for the money they can make out of it, with little knowledge of the proper application of exercise to different individuals for healthful purposes. In these gymnasiums married and unmarried ladies and a few men subject themselves to the most fatiguing exercises each day, by swinging clubs, acting on the trapeze or bar, and going through other acrobatic feats much like the clown in tights. This undoubtedly in some cases ends in harm as I have had opportunity to see in large fat persons and young girls who were entirely unaccustomed to physical exercise. The public should be impressed that only a carefully graduated exercise is beneficial, whereas sudden and violent exercise may cause disastrous results in corpulent persons and others. We as physicians

should discourage the attendance at gymnasiums unless these be kept under supervision of a thoroughly competent person.

DR. O. L. WILLIAMS, of Oak Cliff: "The subject of physical culture is one of such vital interest that we cannot and should not longer ignore its benign relations to present and future generations. In discussing the subject there are so many things to be considered that it cannot be treated in an abstract way. The present system of education must be revised before a symmetrical and harmonious development can be realized. The brain must not be cultivated at the expense of physical vigor, as is now the fashion. Intellectuality is dearly bought when physical weakness is the price paid for it. Physical degeneracy and neurotic troubles are alarmingly on the increase. Sanitariums for neurasthenics are springing up everywhere, and physical vigor is the exception rather than the rule. My honored friend, Dr. Clopton, in calling attention to this subject, has furnished us with additional evidence of his well-balanced mind. As physicians it is our duty to study this subject more and reach the masses by direct appeals."

DR. CLOPTON (closing): "I didn't hear very well what was being said, but I think Dr. Gray's position is that we know so little about exercises that we cannot intelligently prescribe it, is a very unfortunate one for the medical profession. I contend that there are cases in which the physician alone is capable of indicating the special exercise required for the development of the body, and you certainly can develop certain parts of the body and not injure others. Again, a person presenting himself before you with weak lungs or predisposed to consumption, would that person need the same exercise as another with sound lungs? The knowledge of the medical man as to the necessity and character of exercise requisite in a given case is more important than a knowledge as to the special article of the materia medica indicated. Now, I agree with the doctor as to the unscientific manner in which exercise is carried on in the various gymnasiums of our country. While exercise may injure a few, in the majority of cases even these unscientific courses in the gymnasium develop the man and make him a better one in every way, but to acknowledge that the medical profession is incapable of giving any advice upon this important subject, is an unfortunate acknowledgment."

FARADIC ELECTRICITY IN INFLAMMATION.

O. L. WILLIAMS, M. D.

DALLAS.

In presenting this paper for your consideration, I am not unmindful of the professional prejudice that has given birth to a determined and relentless warfare against electricity from its inception.

Unscientific deductions due to a want of systematic investigation accounts for this merciless crusade.

All innovations in medicine from the days of Jenner have had to pass through the same crucible of professional criticism. There can be no objection to this; on the contrary, it is and has always been a safe-guard against the theories of ultra-extremists and enthusiasts.

While this is true, a certain measure of enthusiasm is necessary to inspire the truth seeker with the proper degree of application, energy and persistency necessary for investigation, intelligent deduction, the development of new theories, and their elaboration into facts.

The superficial thinker, the casual observer, the spasmodic investigator will never rise above the average professional mind in efforts to grasp progressive ideas, conceived and elaborated by minds disciplined to thoughtful study and patient research. My observation of the physiological effects and the indications and contra-indications for the employment of Faradic electricity through a decade of years entitle my conclusions to some little consideration.

In presenting these conclusions I am prompted only by a fraternal desire to remove prejudice, awaken interest, and encourage research in the interest of a neglected therapeutic agent, stigmatized and condemned because found in the hands of quacks

and charlatans. This tirade of abuse can not much longer prevail when such men as Apostoli, of France; the Keaths, of London; Rockwell, Morton, Goelett and Munde, of New York; Martin, of Chicago; Massy, of Philadelphia; Engelmann, of St. Louis, and others, many of whom occupy prominent positions as teachers in the great medical centers, whose professional characters are above reproach, whose literary productions are accepted as text books to guide the general practitioner, and whose voices have been heard in defense and commendation of this much abused therapeutic agent.

When I shall have finished reading this paper embodying my observations and conclusions, however crudely expressed, it will be, so far as I am aware, the first paper read in this country favoring the use of Faradic electricity in acute inflammation. Believing as I do that the time is not remote when it will rank with, if not surpass, our most highly esteemed therapeutic agents for controlling inflammation, I esteem it a privilege and honor of which I justly feel proud. I would be unfair and unjust if I failed to state that my esteemed friend and former partner, Dr. W. T. Baird, of this city, who was my preceptor in electricity, has long been familiar with the results of Faradic electricity in acute inflammation, having demonstrated to my satisfaction years ago its benign influence when thus used. But he has never given publicity to his conclusions, leaving that pleasant duty to your humble speaker. It is not my purpose to give a history of Faradic electricity from its inception three score years ago, and trace it through its tragic fluctuations in professional esteem. It is a matter of record, and can be found in any of the text books on electricity. I shall try and confine myself to the practical part of the subject.

To make myself better understood, it will be necessary to refer briefly to the pathology of inflammation.

It is a subject that has always been one of deep interest to the medical profession.

Until in recent years, when the histological changes which ensue in the animal organism from the presence and action of

specific micro-organisms was advanced, there were no well defined ideas as to what its pathology was.

I have not the time even if I possessed the ability, to enter into a full discussion of its pathology; hence I shall only discuss some of its most prominent factors, to better exemplify how Faradic electricity may be utilized to arrest and discuss the inflammatory process.

The one factor that concerns us most is arterial, venous and capillary dilitation. Of the three, the capillary disturbances are the most prominent and the most serious.

The dilitation in the arteries of smaller caliber is first observed. Soon the veins become involved, and lastly the capillaries. So rapid is the morbid process that often in a few hours the lumen of these vascular channels are double their normal size. Capillaries ordinarily scarcely recognizable, containing little if any blood, soon become visible, adding turgidity and redness to the inflamed area.

So long as there is a continuous, uninterrupted flow in these channels the corpuscles flow on in their respective currents, the white and colored corpuscles are carried along the stronger central stream, and a few find their way into the more sluggish, peripheral side current bearing the leucocytes and third corpuscles. The circulation now becomes more obstructed until congestion is established.

Soon intra-vascular changes occur. There is a slowing of the capillary stream and with it an aggregation of the corpuscular elements. Then the leucocytes are separated from the central to the more sluggish current, where they aggregate into heaps and masses, impeding still more the current flow. With diminished flow comes also separation of blood corpuscles favoring obstruction already commenced in the peripheral channel by the leucocytes. Soon they become attached to the wall of the vessel, and by continuous aggregation reduce the lumen of the channel until complete stagnation ensues.

Just here I wish to emphasize an observation of Paget's, that blood in stagnated vessels has little tendency to coagulation;

hence the possibility *resistitutio ad interim* of the circulation after subsidence of the acute symptoms.

Another fact I wish to enforce is that stagnation first occurs and is most pronounced in the tortuous capillaries, where of necessity the current is most sluggish.

Senn says: "Alteration of capillary wall has been repeatedly enumerated as the most important feature of inflammation, and without such change the rapid escape of leucocytes, as we find it in inflammation, would be utterly impossible."

The cause which has produced the inflammation produces such an amount of softening in the cement substance as to permit its penetration by the leucocytes between the endothelial cells, or, as some of the authors claim, localized minute defects cause the formation of minute openings through which the leucocytes escape.

Pain in many forms of inflammation is also a prominent factor. To traction and pressure on the sensitive nerve filaments must we look for its solution. Unless suppressed it will cause an increased determination of blood to the inflamed area, without in any way encouraging the collateral circulation, thus increasing blood pressure, favoring capillary rupture, exudation, transudation, and leucocytic migration. To pursue this pathological investigation further would transcend the limit allowed by this association for such papers. Therefore I shall omit much that is interesting, and endeavor to exemplify how Faradic electricity meets the pathological conditions of inflammation.

In the first place, we claim that this form of electricity, acting through the vaso-motor nerves, contracts the arterioles, limits dilitation, and prevents distention, and in so doing, the secondary effects, such as transudation, exudation and vascular changes, are proportionately prevented.

In the second place, possibly through its vibratory mechanical action, the blood current through the vascular channels is urged onward, the peripheral and axial zones of the current being alike promoted, thereby preventing accumulation and aggregation of leucocytes. An unimpeded blood current also interposes a bar-

rier to the fixation of the leucocytes to the capillary wall, opposing their aggregation, and in the same degree preventing one of the causes of obstruction of the blood stream. This force not only expends itself on the larger channels, but through its deep inter-polar action reaches the remote arteries, and, secondarily, the delicate capillaries, whose marked tortuosity favors stagnation. There we have shown the most disastrous circulatory disturbances occur.

It does not stop here, but its effects on the collateral circulation are very decided and pronounced, thus diverting the blood to other channels than those leading to the inflamed zone.

This deep inter-polar action reaching far beyond the range of topical applications, such as poultices, fomentations, and blisters, gives to this agent a range of application inestimable and far-reaching.

The decided effects of this current in keeping open the blood channels can not be too much emphasized. In so doing, transudation into the extra vascular tissues is limited, and as this extra vascular pressure is a prominent factor in favoring obstruction of the circulation through the capillaries by compression, it meets one of the most prominent indications in the inflammatory process. Not only so, but as pain is largely due to pressure from these exudates on the nerve filaments, whatever will limit transudation will proportionately prevent pain.

Another equally potent fact can be deducted from an arrest of these exudates. They are loaded with microbes; hence the more rapid and extensive the process of exudation, the more rapid and diffusive the systematic infection.

But its usefulness does not stop with the congestive stage. When stasis is established, when the axial area of the inflamed zone is being rapidly devitalized and cut off from the vitalizing blood, Faradic electricity in the same physiological manner, by establishing a vigorous collateral circulation, by preventing obstruction in the affected capillaries from the aggregation of the leucocytes, and by keeping open the blood channels, prevents over-distension, which we have shown impairs the integrity of

the delicate capillary walls, hastens vascular changes, and predisposes to capillary rupture.

Proportionately, transudation, exudation and extra vascular accumulation into the surrounding lymph and connective tissue spaces is prevented. Nor is this all it does. It preserves intact the circulation up to and around the inflamed zone, whereby highly vitalized blood, loaded with ozidizable elements, is kept constantly injected into the disintegrating structures, interposing a barrier to its extension.

Senn has truthfully said "that an unimpaired visa tergo is one of the best means to prevent stasis within the inflamed capillaries, and practical experience has shown that all remedies and agents that diminish the intra-arterial tension only diminish the prospect of a favorable termination."

There is another phase of the Faradic current worthy of mention, viz: its distribution of the phagocytes to the seat of inflammatory warfare through a well preserved circulation. The absorption of aseptic tissues in the human organism by certain cells is believed and defended by some of our ablest pathologists. Through these phagocytes, dead tissue is removed and micro-organisms destroyed. The leucocytes are accorded a prominent place in this group of scavengers. But to remain operative, the circulation must be preserved. When stasis occurs, they are cut off and their benign influence is lost in the stagnated zone. The Faradic current, by keeping open the blood channels, prepares the way for constantly reinforcing this army of systemic microbe destroyers, limiting infection. It also favorably influences the temperature. Some stigmatize this as a strained and delusive conclusion. Gentlemen, if the physiological effect of Faradic electricity as outlined by me fails to do this, my entire theory is fallacious.

It would be unreasonable, after studying the pathology of inflammation, to anticipate any such marked reduction in the temperature during the height of the inflammatory process with so many disturbing factors at work, as can be secured from aconite and the coal tar products. On the one hand we have

Faradic electricity gradually but slowly arresting and removing the inflammatory process, and with it all systematic manifestations. On the other hand, we have a class of agents truly superficial, whose greatest power, in my opinion, is heat elimination.

That great exponent of American surgery, Senn, has truthfully said of these antipyretics, "that they accomplish their work at the expense of the processes which are laboring to clear obstructed paths, and on this account their use has resulted in more harm than good to the patient." But you ask how can Faradic electricity modify temperature? I answer, inasmuch as elevation and temperature in inflammation is the result of the entrance into the blood of micro-organisms or their products in the form of ptomaines, whatever prevents their multiplication and lessens their products must of necessity lower the symptomatic fever. This we have endeavored to show Faradic electricity will do. Not by any direct chemical action through the blood, although some claim for it this power, but through its indirect physiological effects.

But Faradic electricity does not stop with an arrest of the inflammatory process. The same physiological effects exerting their potent influences in re-establishing the normal circulation in the affected capillaries, promoting absorption and favoring rapid granulation, the latter erecting, as it were, an impermeable wall around the suppurating or sloughing cavity, whereby both processes are arrested. It does more than this, during the height of the inflammatory action, when the sensory nerves are crying out against traction and pressure to which their delicate filiments are subjected, the soothing and quieting effect of the Faradic current is unquestionable. This is, in my opinion, accomplished by removing the products of exudation and transudation, and with them the pressure from the nerve filiments, which is the cause of pain.

A forcible demonstration of this is found in cases of suppurating osteo-myelitis or periostitis where pain is rapidly dissipated

by operative procedures, permitting an escape of the encapsulated inflammatory products.

I have thus briefly sketched the pathology of inflammation and the therapeutical effects of Faradic electricity.

I have tried to exemplify how it arrests the inflammatory process, how after arresting it it may hasten resolution, promote absorption, hasten granulation and expedite restitution; how it may subdue pain and lower temperature. It is due that great apostle of electricity in gynecology, Apostoli, of France, to record in his own words the estimate he places on Faradic electricity in acute inflammation of the uterus and its appendages. Gentlemen, if this agent will subdue inflammation in the uterus and its appendages, it will act with no less certainty in inflammation located elsewhere. The pathology is the same wherever localized.

Apostoli says: "The common feeling of the profession certainly is that a paliative treatment is all that can be adopted in this disease."

When called to a woman suffering from perimetritis or phlegmonous inflammation, it is mostly with reluctance and hesitation that anything more is done than to order soothing applications to the abdomen and await results.

I protest against this sterile inactivity, which prevents no mischief, does nothing in the way of cure, and leaves the disease to run its own course unopposed.

Although the opperative proceedings which I think necessary require great caution, I undertake them for two definite objects; first, to calm down the pain the patient is enduring; and, secondly, to arrest, if possible, the inflammatory action and to prevent its running on to suppuration. I Faradize every woman, even when under an acute attack of inflammation, observing, however, the following practical rules. These rules are so practical, so concise, so easily understood, and are so much in accord with my own observations, and with some slight modifications applicable to all forms of inflammation, that I embody them in this paper:

First—I prescribe every Faradization that would cause the least pain, and expressly that of quantity engendered by the bobbin with short thick wire.

Second—I use for such cases the bobbin with long fine wire, from which I obtain a current of tension on account of its special anodyne effects.

Third—I begin with a simple vaginal application by means of a bi-polar electrode, the point of which is placed against the inflamed part.

Fourth—I only employ a current easily bearable, so as to cause no suffering, nor any excitement of the patient, as this would insure an entire failure of the treatment.

Fifth—All the success of this medication depends upon making the first sittings sedative, so that they may serve as a prelude to more active measures, and the faradization will only become hyposthenic on the double condition of its low intensity and its long duration.

Sixth—Each sitting should last five, ten, fifteen, twenty or twenty-five minutes, as may be required, and should not terminate before the patient spontaneously declares she is better and suffers less.

Seventh—It is unnecessary to reinforce what has been said by dogmatically averring that no success will come out of this treatment, unless it be managed not only without violence, but with extreme gentleness.

Eighth—There may be one or two sittings each day as may be wanted, for lowering the febrile action, allaying pain and bringing about what is called the subacute stage of inflammation.

Ninth—Every faradization should be preceded and followed by a vaginal irrigation with sublimate solution, and all sounds should be scrupulously disinfected.

These rules come to us from a world renowned electrician, who has done more to place electricity on a solid basis than any man living. As to my method, will say in all applications to subdue acute inflammation I prefer the current of high tension from the long fine wire. The machine I use is before you for

inspection. It is manufactured by Jerome Kidder Manufacturing Company of New York, and the coil of fine wire, No. 36, the smallest that can be used, is 4500 feet in length. While I prefer a current from this coil on account of its more sedative effect, I am not in accord with Apostoli in his sweeping proscription of the primary short, heavy coil. Some of the most striking results I have obtained have been secured from the coarse, short primary coil of the Kidder battery. Whether my success was due to the method employed, I am not prepared to say. In using this coil I have always adopted the method suggested by Dr. W. T. Baird, which, so far as I am aware, originated with him. It consists in connecting the positive electrode with a short cord, fully one-third shorter than that with which the negative electrode is connected. His theory is that there is a neutral point in the circuit equi-distant from the opposing electrodes, and by lengthening the negative cord this neutral point is located more remote from the positive electrode and the seat of inflammation, thus guarding the inflamed structures against any negative electricity.

In using this primary coil, the electrodes must be enveloped in flannels wet with a warm solution of table salt, to better enable the current, which is one of nominal electro-motive force, to overcome resistance. In treating inflammation, a current such as is suggested by Apostoli, of low intensity, should be used, long continued. I have found it necessary to prolong the applications far beyond the time he suggests, and with more frequency. Indeed, I attribute the satisfactory results I have obtained to these prolonged seances. My applications seldom stop short of one hour, unless evidence of fatigue is manifest; and in one case I can recall, when treating a violently inflamed parotid gland, induced by complete occlusion of the duct, on several occasions the applications continued for three hours. As a rule I find it necessary to repeat the applications at least one hour in every four.

It is astonishing with what comfort to the patient this treatment will discuss a carbuncle. Recently one of my medical

periodicals contained a criticism from a two-by-four doctor, with more egotism than brain, who said electricians were certainly referring to the internal treatment of the poor uterus, or some other concealed zone where their vague theories were undemonstratable. If I had him here with a carbuncle on his dignified person I would show him its benign influence in the light of day.

Where the sensibility is pronounced, a current of low intensity is indispensible. If not otherwise obtainable, such a current can be secured by using large electrodes, reducing their size as the sensibility is subdued. In diffuse peritoneal inflammation I cover the entire abdominal surface with an electrode made of the ordinary brass wire gauze used by tinners in making milk strainers. They are cheap, easily improvised, are flexible, and can be made to conform to any irregular or uneven surface. They are equally convenient in treating the limbs, being easily bound to any part.

When pain is pronounced, a current of more intensity will sometimes act more decidedly, especially if the central and peripheral extremities of the nerves be embraced in the circuit. A reduction in the size of the electrode will likewise increase the intensity of the current.

There should not be too great a disproportion in the size of the opposing electrodes. With a positive electrode covering the abdomen the negative electrode should not be less than four by ten or twelve inches, or the outgoing current will be too irritating. The electrodes should be so placed so as to run the current through the inflamed zone.

In the treatment of smaller lesions the electrode must be made to conform to the inflamed area.

The positive electrode must always be placed over or above the seat of inflammation. All electrodes should be well protected with flannels previously wet with hot water and applied warm. Having applied the electrodes, reduce the current to zero, make the connections and start the battery, then cautiously increase the current, and always stop short of the least discomfort.

The length of this paper forbids my speaking of the effects of the different coils, and the necessity of familiarizing yourselves with the effects of rapid and slow interruption of the vitrater, a proper conception of which is absolutely necessary in the use of this form of electricity.

I would have been pleased to speak of the class of cases I have found this agent most useful in. Possibly some time in the future it may be my privilege to do so.

DISCUSSION.

In conclusion wish to say that in many forms of deep seated inflammation remote from surface applications, as for instance, appendicitis, Faradic electricity, used as suggested, may prove a valuable adjunct to our therapeutic armamentariam. My experience with it has been confined to two cases. The first I saw in consultation two years ago with Dr. R. G. Williams, who had for four days treated the case vigorously with the agents ordinarily used in such cases as morphine, fomentations, etc., without avail. The pains in this case were so formidable that morphine pushed to the degree of semi-narcosis failed to give comfort. I urged the Faradic current, and in twelve hours symptoms of improvement were manifest. One-fourth the quantity of morphine before given was ample to give tranquility, and in one week the case was convalescent, with no recurrence to this time.

The second was a much graver case. The initiatory symptoms were uncontrolable; vomiting for thirty hours; elevated temperature and marked depression. The tumor was prominent and the outlines well defined. Periosteal involvement, extension reaching downward to the pubes, involving the ovaries and tubes, and inducing a menstrual flow. Pain was constant. After the vomiting subsided, the stomach was left weak and enervated, and in a few days rebelled against all medicine, forcing me to rely alone on my electricity, which I used one hour in every four. The improvement from then on was slow but decided, the patient expressing comfort from each application. The treatment was continued for thirty days, the last five or six during convalescence, designed to overcome the subacute stage of this disease, which in my opinion accounts for the liability to recurrence. Had it not been for the electricity in this case, I would have been therapeutically helpless, and furnished one more subject for abdominal section. I shall watch this case to note any recurrence. O. L. W.

SECTION ON OBSTETRICS AND DISEASES OF CHILDREN.

REPORT OF CHAIRMAN, A. B. GARDNER, M. D.

BELLVILLE.

GENTLEMEN OF THE ASSOCIATION—Should I attempt in this report to discuss all that has been written on the subjects embraced in this section, I would prolong this paper beyond your endurance and edify you but very little. I shall not consume your valuable time with such a paper, but briefly refer to a few subjects only. The act of parturition is a natural, or physiological process, and in its normal conditions requires but little or no assistance from the accoucheur; and he who most readily detects any deviation from the normal conditions either in the parturient woman or in the fœtus, and speedily and safely corrects this, or comes to the aid of a defective pelvis, or corrects any mal-position, or any other abnormalities, fulfills in the broadest sense the duties of the accoucheur.

Do not understand me to say that he should not use every precaution against septic infection, and closely watch every symptom of disorder in the mother before and after confinement. This should be his constant care. Within the last two or three years the old operation of symphysiotomy has been revived, and time enough has now elapsed to verify the results from it under our improved modes of aseptic operating and antiseptic treatment; the results have been the most satisfactory, both as to the mother and child.

As most of the women requiring the operation are working women, their ability to afterward earn a livelihood is of the greatest importance in considering the operation. Van Woerz reports ten symphysiotomies performed by himself, with the fol-

lowing results. One died of sepsis after the operation; six are in good condition, able to work without any inconvenience; one lost sight of; one can not stoop to work on hands and knees; one suffered from incontinence of urine, which yielded to treatment.

Braun reports eight cases. None died; six are in good condition, working without inconvenience; one suffered from incontinence of urine and sacro iliac pains on heavy lifting; one has incontinence of urine on heavy lifting or straining.

There are many other cases reported with about the same results. Most of the cases were wire sutured, while some were not sutured. The results were about the same, and it would seem that the drilling and suturing is unnecessary.

Dr. Coe reports the case of a dwarf on whom he performed cæsarian section three times successfully, within three and one-half years. The last time he ligated the tubes to prevent further conception. Guereilot reports two cases on which he performed cæsarian section twice each, successfully.

The subject which has been agitating the professional mind most for the past twelve months, is the discovery of antitoxine in the treatment of diphtheria, and I may add that the laity seem to have become familiar with it too. Through the wonderful accounts given of the successes of some celebrities by the secular press, every cross-road doctor has been expected to be prepared to inject every urchin who shows the least symptoms of diphtheria with fresh antitoxine serum, just imported from the laboratory of Behring, Arohnson, or some no less renowned European, who has gained much notoriety through the sensational reports of the daily press of their wonderful cures of diphtheria. Yet, while all the expectations of the enthusiastic discoverers have not as yet been realized, we must await that great and only test, clinical observation, and by the results must we judge it. The reports so far given us vary. To recount all the observations given by clinical institutions would be much of a repetition, and I shall only refer to a few in this country and abroad.

The following experiment was made in New York city last December, at the Infants' Hospital, which contained 600 chil-

dren. When diphtheria appeared in that institution, the throats of all the children were examined repeatedly, and in sixty of them were found the diphtheria germs, Klebs-Lœffler bacilli. These sixty cases were divided into two groups, regardless of symptoms, and were kept from contact with each other. One-half of them received no other treatment than naso phareyngeal douches of a normal salt solution three times daily. The other thirty, in addition to the salt douche, were given hypodermically daily one and one-half c. c. antitoxine, but in neither ward was there a case of diphtheria developed. Of course nothing was proven, but had the treatment been applied to all those where the bacilli were found, wonderful results would have been reported. Again, six cases were treated in this institution; three with, and three without antitoxine; all received as a local douche the salt solution; all recovered. So far as these experiments are concerned, nothing is proven as to the efficacy of the antitoxine treatment.

Dr. Fischer, of New York, reports thirty-four cases treated with antitoxine, with two deaths, and remarks that the statement of Baginsky should be remembered, "That we have never had so low a mortality from diphtheria." But the doctor uses salt water irrigation, and swabs the affected parts frequently with a solution of one to 2000 of bi-chloride of mercury, and at the same time uses alcoholic stimulants when there are any signs of heart failure.

Behring and his co-laborers have declared that a satisfactory result can only be expected from the antitoxine injections during the first few days of the disease. The earlier the treatment is resorted to, the better the results. Koertes' figures prove the correctness of this statement. Out of fourteen—seven injected during the first three days—eleven recovered and three died. In twenty-nine cases in which the serum was not used until the fourth day, twenty-two died, seven recovered. From the moderately severe cases which were treated, early eighteen recovered and five died, while of those not treated before the fourth day, fourteen recovered and eight died.

Nevertheless there is a class of cases which seem to resist the antitoxine treatment altogether. Bacteriologic examination developed the presence of streptococci and no Klebs-Lœffler bacilli.

Koertes, of Berlin, discussing the antitoxine treatment, says: "Bacteriologists say that antitoxine, if early used, will almost surely cure all genuine cases of diphtheria."

They wish those cases excluded which are complicated with other bacteria or cocci. In regard to this I must say that we as practicioners, when we talk about the cure and treatment of diphtheria, must keep in view the clinical symptoms and appearance of the disease. And under this well known and fully characterized picture also those cases belong which are described as mixed infection. Every physician will class such a case as a severe one of diphtheria. From this point of view it is not at all probable that antitoxine will cure all cases of diphtheria in its broadest sense; also the assertion that in an early and sufficient use of the serum all cases of genuine diphtheria can be cured is not yet proven.

There is a possibility that in the various epidemics that those cases of mixed infection are so frequent that they make a limit for the use of the serum, and Koertes concludes with the remark that a longer continued observation at the bed side only can bring a decision as to the value of antitoxine.

Bucher von Ranke & Seitz, of Munich, in discussing the antitoxine treatment of diphtheria before the medical association, say: "The number of cases in Munich are too small to form any definite conclusion," and add that it may appear surprising that in those cases which have come to a post mortem examination the local diphtheretic process had not been ended after a treatment of from twenty to twenty-eight days in spite of the large doses of the serum.

Emmerich in his remarks laid stress upon the observation that in all the fatal cases of diphtheria at Munich, besides the Lœffler bacillus, also striptococci, staphylococci or the bacillus pyogenes fetidus, were found.

In conclusion, gentlemen, I can only say that in my humble judgment the only course for the practitioner to pursue is to await the results of clinical observation, and not fly to a new and unproven panacea.

THE DIAGNOSIS AND TREATMENT OF DIPHTHERIA.

A. H. SCHENK, M. D.

KENNEY.

In recent years much has been added to our knowledge of diphtheria, so that it is now probably the best known of infectious diseases. Trendelenburg and Oertel many years ago pointed out that micro-organisms were the cause of the disease; but it remained for Klebs and Loeffler to isolate a distinct germ, of which they obtained cultures, and inoculations in animals produced a disease with pathological changes like those of diphtheria. These claims were supported by other investigators; however the germ origin of the disease never received such general acceptation as when Roux and Yersin published their classic investigations in 1890. In our own country these conclusions have since been corroborated by Prudden, Welsh, Abbott, Park and others. At the eighth international congress for hygiene and demography, held in Budapest in 1894, a committee was appointed, consisting of Professors Behring, Loeffler, Mosler, Pistor and Struebing, for the purpose of formulating the sentiment of the congress on this question. It reported as follows: "The cause of diphtheria is the diphtheria bacillus. There exists no doubt as to the causal relation between this bacillus and diphtheria." In a recent official report of the New York board of health it is announced plainly that diphtheria is produced only by the diphtheria bacillus. Against these emphatic teachings only one eminent voice of discord has arisen. David Hansemann, in an article in Virchow's Archives, discredits all work that rests on an identification of the Klebs-Loeffler bacillus with the cause of diphtheria. His main ground for contention is the occurrence of numerous cases which run a

clinically typical course of diphtheria, but in which repeated examinations fail to show the specific bacillus. The recent literature of Park, Biggs and Berg confirm that certain forms of angina are met with, which at the bedside can not be distinguished from diphtheria, in which the disease is attributed to the presence of so-called bacilli of pseudo-diphtheria. The presence of staphyllococci, streptococci, diplococci of pneumonia has been noted by observers in cases of membranous sore throat where the true diphtheria bacillus was absent. Loeffler and Martin speak of three varieties of diphtheria bacilli of which each, according to its size, gives rise to a relative degree of virulent infection. Martin alone claims to have discovered a small coccus, found only in so-called croup, in a number of cases that had been brought to the hospital as diphtheria patients, but wherein examination failed to find the pathognomonic bacillus of diphtheria. Prof. Escherich, in an article on croup, speaks in a doubtful manner about the dual nature of these diseases. He states that out of a large experience he has failed in only two instances to find the true diphtheria bacillus in cases of so-called membranous croup. In the official report of the New York board of health, already mentioned, we find stated that these cases called pseudo-diphtheria show a small death rate, *i. e.* 2 per cent. Evidence seems cumulative that a membranous sore throat is, in a small number of cases, due to different organisms; still we have only one way to arrive at a positive differential diagnosis, and this is a bacteriological examination. This is very unsatisfactory for the general practitioner, since very few physicians are equipped or have the time for such work, even if they possess the required knowledge. The old methods of differential diagnosis between diphtheria and true croup, which originated with Virchow, is fallacious and can no longer hold good. It has for its basis the assumption that diphtheria is a constitutional disease; that in the former the membrane extends into the mucous and sub-mucous layers, and invariably makes its appearance on the tonsils, whereas in the latter the membrane lies loosely on the mucosa and forms first in the

larynx. Drs. Biggs, Park and Beebe, in a clinical and bacteriological combined method of observation in 5,000 cases, reach the conclusion that many of the less characteristic cases of diphtheria and pseudo-diphtheria are so much alike that a bedside diagnosis can not be made. In this respect my experience in an epidemic of diphtheria teaches me that the first site of the exudate may be the larynx nearly as often as the tonsils or pharynx. I was not able to detect any peculiarity in the membrane as to the attachment, consistence or color that might aid me in diagnosing further cases. The signs and symptoms, local and general, differ in this as they do in different epidemics of measles, scarlet fever or other diseases. The writings of Bretonneau and Trousseau make the impression that in their time grown persons were more frequently attacked than happens nowadays. The skin and larynx seem to have been a more frequent seat of membrane formation. Bartels and Minnich record the occurrence of numerous isolated cases of laryngeal croup that were forerunners of a general outbreak of diphtheria. An epidemic of the disease broke out near Kenney in 1892, in which I treated forty-four cases. Since then I have seen a number of isolated cases at different times, making in all upward of sixty cases. In some the larynx was invaded first; in others the pharynx. In my situation I was unable to say positively whether all were cases of true diphtheria or not. I treated them as diphtheria patients, and from personal experience know this to be the only safe plan to pursue, unless a bacteriological examination justifies a change of opinion.

Treatment: Since all the old modes of treatment have generally yielded results so far from satisfactory, I shall first give the modern antitoxine treatment notice, if only for the sake of innovation. From personal experience I can not speak. Although I have recently had sporadic cases of diphtheria, I chose another treatment. The preventive treatment made me skeptical. It can not be expected that a preventive treatment, which has for a basis the assumed imitation of the natural process, can confer immunity when nature herself fails to reach

such an end. Wolff Levin reports a case wherein the disease occurred after an immunity treatment, and subsequently a relapse took place. I have seen two cases of relapse take place. The disease itself should insure immunity at least. Among the children of our family a little boy aged five years contracted diphtheria. The progress of the disease was moderately severe. At the end of the second week only a trace of the membrane remained on the tonsils; the fever had subsided, leaving him extremely weak, with reappearance of appetite. At this juncture he re-inoculated himself by scratching on the verge of the anus. In twenty-four hours a large membrane had developed; there was high fever, and death took place from heart failure within forty-eight hours from auto-infection. Another child two years old, a sporadic case, seemed to suffer from a membranous laryngitis of diphtheroid nature only. Under treatment it improved. Large portions of membrane came away, and on the sixth day all exudation had disappeared, which earlier could be seen low in the pharynx. Breathing, which had been stridulous, was natural, and when the fever subsided the case was discharged. It was bright and took nourishment eagerly. Several days thereafter I was called again to find the same patient in a dangerous state of toxæmia, with the pharynx and nares occupied by a membranous exudate. Statistics have been published on results favorable to preventive inoculation. It seems to me they have been compiled in an enthusiastic haste, and are for this reason not trustworthy. I have seen many children escape the disease where separation was impracticable and no prophylactic measures were adopted. As a prophylactic I have used salt water, borated water, carbolized water as recommended by Caillé, with little success. Innumerable reports have been published during the last several months testifying to the remarkable action of antitoxine in the active treatment of the disease by Washbourn, Goodall and Card of England; Emmerich, Raginsky, Lublinski and others, of Germany, and Fischer, Berg, Koplick, of the United States. Dr. Cheatham, of Louisville, is carried so far by his enthusiasm as "to claim it nearly criminal

to treat a patient for diphtheria without antitoxine." Whatever these gentlemen have been led to believe by honest observation, I am of the opinion that utterances on this subject should as yet be made with the utmost caution. Dr. Jos. E. Winters, at a recent meeting of the New York Academy of Medicine, in discussing the serum treatment of diphtheria, says that after three months of faithful and unbiased trial of their treatment in 154 cases in the Willard Parker Hospital, he has come to a sad, an extremely sad disappointment. He also analyses some statistics offered, and shows them wanting, as they contain cases where bacteriological, but no clinical evidences, were present to prove the disease. He shows that septicæmia resulted in many cases where babies were injected with horse serum, which is known to break down the red blood globules and cause products of decomposition. In a letter to the New York Medical Journal, letter dated April 13, Dr. Armstrong reminds the advocates of the serum treatment of some physiological facts which have not been considered, namely, "the globulicidal power of the serum of one animal when injected into the blood of another. Landois and Daremberg state that serum of one animal causes rapid dissolution of red blood globules when transfused into the blood of another. Hayem and Lazet, from experiments, also conclude that transfusion of alien serum tends to formation of clots, or emboli, which may involve the function of organs or death itself." At this stage of our knowledge of serum therapeutics considerable evidence is necessary to prove its efficacy, and if the results of Landois, Daremberg, Hayem and Lazet be accepted, its use will be substituting one danger for another. Two deaths following immediately the injection have been reported. These have been attributed to the cause implied by the quoted experiments. In Vol. 47, No. 15, Medical Record, a report of Dr. Cordeiro, U. S. N., to the surgeon general of the navy, after a thorough study of the value of antitoxine treatment in the various hospitals of Berlin, concludes that so far proof is lacking of its usefulness. Among the many medicines recommended, such as bichloride of

mercury, peroxide of hydrogen and other antiseptics, I have used a number. In my last cases where the larynx was threatened with occlusion I gave calomel in 1½, 2 or 3 gr. doses every one, two or three hours until too free purgation contra-indicated its use. This remedy was used by Bretonneau, and it is of undoubted value. After stopping calomel, I believe 10-drop doses of tincture of iron with strychnia, given in lemon syrup, meet most of the indications. Calomel fumigation I have used in a number of cases, and I would recommend it for use in every case. The apparatus devised by Dillon Brown seems practical for their use. I have found the stand and spirit lamp of a common steam atomizer, with a common iron stoneware cup for an evaporator, to answer every purpose. Early I evaporate about 20 gr. calomel under a small tent every two hours, and when the disease seems to be diminishing in severity they were repeated every three or four hours. For local application I have in most cases used a mixture containing 1 drachm pure carbolic acid, 2 drachms strong sol. of perchloride of iron, 10 grs. menthol dissolved in pure alcohol sufficient to make 4 fl. ounces. This mixture I applied with a double bulbed Richardson atomizer every two, three or four hours. The swab I used in my first cases, but I shall not resort to its use in the future. The spray spreads this solution well over every portion of the throat, also nares, and by experience I find that larger children will yield to persuasion and thorough treatment with it, when they prefer death to repeated insertions of a swab. Irrigation with medicated solutions I have not tried, remembering that the nasal douche has been warned against by specialists. Its use also causes violent prolonged struggles on the part of the child, and these must be avoided if possible. Keeping up the strength is of first importance. A patient with diphtheria, as a rule, loathes food; the sight of it frequently causing efforts at vomiting. I have usually used concentrated fluid food composed of soups with grain, eggs, milk and sweetened whisky when necessary. With such a treatment I have had a death rate of 20 per cent out of sixty patients. One of these, an infant aged two months,

died with little or no treatment. Several died from laryngeal stenosis, in whom intubation might have saved life. The advocates of antitoxine insist on early treatment for the remedy to give the most satisfactory results. I have noticed where cases were seen early in the disease the treatment outlined invariably gave the disease a milder course. In my last five cases, occurring in one family, the first child was in a hopeless condition when I first saw her, and death took place in spite of treatment. This was in February, when the American agents were not able to supply the demand for serum. The four subsequent cases in this family recovered. Certainly, had the serum been procured and used, my happy results would have been credited to its use. I have lost no patient over six years old, and the disease seems amenable to treatment, proportionately as the patient is willing to be subjected to careful treatment. The oldest subject treated was fifty-nine years of age, with recovery. In preparation of my paper I have consulted articles in Wood's Ref. Handbook of Med. Science; Bibliothek der Gesammt Med. Wissenschaften; The Medical Record, '92, '93, '94, '95; New York Medical Journal, '95; New York Medicinische Monatschrift, '94, '95; American Practitioner and News, and extracts from British Medical Journal, '95; Boston Medical and Surgical Reporter, '95.

DISCUSSION.

DR. POPE, of Tyler: "I have been very much interested in Dr. Schenk's paper, from the fact that this question has occupied several evenings in the Tyler medical society. We agree with Dr. Schenk that there is too much claimed and published everywhere from the use of antitoxine. But there is one particular drug I have had experience with, and that is the nuclein solution. I believe there is some virtue in it, from the fact of the experience I have had with it. I have had three cases in one family in which the microscopic examination failed to show anything more than streptococci. One child I was unable to do anything with its throat on account of violent struggles. It was three or four years of age. I gave him four injections twelve hours apart of the nuclein solution as recommended by Dr. Vaughan.

The second injection the membrane peeled off, temperature fell and the patient rested better; he had no other medication at all. And in several other cases have I used nuclein solution without any other treatment, and there has been rapid improvement. I prefer to use it rather than antitoxine, knowing it can do no harm. There is truth in the theory, and I notice numerous articles from prominent men calling attention to its use. While I will use antitoxine, I will do as every one else does—use stimulants, sprays, etc."

DR. ARMSTRONG, of Dallas: "I hesitate to discuss any question coming before this body, but as the city physician of Dallas I have had considerable experience with this new remedy, antitoxine, in the treatment of diphtheria. My attention was first called to its efficacy by the reports of the United States marine hospital service. I have had here in Dallas within the last three months, some twenty-six cases of diphtheria in my own practice and that of my friends, and I don't think there has been a remedy in this last decade, an aseptic remedy, that in any way compares with the antitoxine treatment of diphtheria. We have had those twenty-six cases here that were positively demonstrated, microscopically, to be diphtheria. Now I recognize and insist upon the different characters of diphtheria and membranous croup. Some were said to be membranous croup. If there were, the antitoxine treatment was as potent and accomplished the same results as in diphtheria. Now, in diphtheria we have albumen. In membranous croup we never have that. In diphtheria we have a species of paralysis. In croup we never have that. In diphtheria it affects the larynx; in croup the pharynx. In diphtheria we have high fever. In croup we have it, though I have seen children die and children get well with diphtheria with a temperature of one-half degree. But what I want to call your attention to is that you can do as you like as regards the use of antitoxine, but the experience of the physicians in this city has been the same as the gentleman's who read that very original paper, and while I am hypercritical, I must say that I thought the paper was the best ever read before this association. He says someone calls it criminal to treat a case of diphtheria without antitoxine, and I endorse that entirely.

"The first case observed was here in Dallas in the practice of Dr. Thompson and Dr. Elliott. That child had a pulse of 150; it was cyanotic, and every evidence was pointing to dissolution. We gave him twenty-five centimetres of antitoxine, and in the morning he threw off the membrane, and it was never reproduced. I sent some of the antitoxine up to McKinney, and they reported to me that it had acted fully as represented. I sent some when it was to be had to the health department of the city of Fort Worth, and the physicians

over there reported that it acted like a charm and that the patient on which it was used recovered. I saw in this city six children in two families, and they all had diphtheria—deposits covering the tonsils—and one where its larynx was invaded and I had to open the trachea and there was a tent-cloth out in front, and I asked the parents to put their sputa on that and let them remain till my next visit, and I found the cloth covered with the characteristic membrane. They all recovered. I just want to add my testimony to the potency of the antitoxine treatment."

DR. WAGLEY: "There is just one feature of the antitoxine treatment I would like to mention. In reading the papers of Dr. Roux and others they state they have reduced the mortality to 25 per cent. I wish to state that I don't believe in Texas any physician ever reports a mortality of over 25 per cent. I for one am sure I never have had such a mortality. In former years I treated a great many cases of diphtheria, but at the time I was a little careful about tabulating them, but in the last few years I have had but seven cases, and out of that number I have lost but one. I have had no experience with the antitoxine treatment, and the treatment I have always pursued has been the usual antiseptic treatment, placing the patient upon tincture of iron and keeping the air passages as perfectly aseptic as possible. It has been my experience that wherever I was able to keep the pharynx clear my patient got well, except one case that died of exhaustion about the twelfth day. That is the only one I have lost in three years out of seven cases."

DR. T. T. JACKSON: "I think we should be proud of Dr. Schenk's paper from the fact it gives a low rate of mortality. It has not been my luck to treat any diphtheria lately. However, I have recently treated a case with many symptoms of diphtheria, which I called membranous croup. It occurred in a mountainous district quite two miles from any other human habitation, in a locality in which I am sure no such thing as diphtheria has occurred in years. The membrane could be detached with less trouble than in diphtheria. There was an absence of albuminuria. The case was treated upon strictly diphtheretic principles. Tracheotomy was done in due time. The child died. I formerly thought all such cases were diphtheria, but upon a close study of this one I concluded it was different from the genuine diphtheria."

DR. SCHENK: "I would like to have had the clinical diagnosis of this case discussed more thoroughly. I have had some sad experiences. My first case was treated by a physician, a very dear friend of mine, in a child, and he made a diagnosis of laryngeal croup. He was treating the case and did not isolate the child. He made his diagnosis on the old original plan that one has a membrane only on the surface,

and the other dips down in the mucosa and that the diphtheria begins on the tonsils, while the other begins in the larynx. This child began with that croupy condition, and the physician who treated the case formed his opinion of course with justification on the old plan of diagnosis. He did not isolate the case, and the result was the family had five cases and lost two more cases—the two following the first one. This made me very skeptical about the old method of diagnosis. This physician is a man whose opinion is valuable to anyone, and from the old method of diagnosis he had a right to come to the conclusion he did. There were, as I have said, two subsequent deaths. I isolated the other two cases, but of course it was too late. The first case was a typical case of so-called membranous croup of the larynx. I have since had two cases that made an impression on me where the same thing I have stated in this case holds good. These were isolated cases, and were situated three or four miles apart, where I thought they were laryngeal croup, but I was sadly disappointed because other cases developed.

"In regard to the antitoxine treatment I have elsewhere stated that experiments have proven that the injection of serum into one animal from another will cause dissolution.

"If the toxine is of value we must first learn how we can use it in the human body without admixture of impure serum. I hold that antitoxine treatment will in the future develop. Prominent doctors now stand against it, and Dr. Winters, who has had experience with 154 cases, giving his results, stands against it. A case is also reported in the medical journals where the patient died, as did the young lady, Miss Valentine, of Brooklyn. I for one am not willing to resort to it as long as eminent men state, as Landin does, that injections of alien serum produces a detrimental effect when injected into the human blood."

SUPRA-PUBIC PUNCTURE OF THE BLADDER IN OVER-DISTENSION OF THE CYST, COMPLICATING DELIVERY.

T. W. SHEARER, M. D.,

WALLISVILLE.

The operation known as "paracentesis," or tapping for various purposes, has of late been discarded by many prominent operators; abdominal section and free incision with drainage, in appropriate cases, having to considerable extent replaced the old operation.

There are, however, cases in which there is no infection, and subsequent drainage is unnecessary, or would be harmful. In these cases aspiration or puncture is the legitimate, in fact, the ideal operation.

The title of this brief paper was suggested by a case of this kind occurring in my practice, the details of which are as follows:

A young negro woman had been in labor for about sixty hours without any professional help other than an ignorant midwife. An examination showed the os uteri to be fairly well dilated, and the head engaging the upper brim of the pelvis. The patient was in a very nervous and exhausted condition; pains weak and irregular. The suffering was so severe that a nerve storm simulating eclampsia appeared at the approach of every pain. A soft edematous tumor could be felt in the median line of the abdomen in about the normal position of the bladder—the gravid uterus occupying a position to the right of the median line, the fundus being furthest removed from the normal exis. Upon making a physical examination, the edematous fluctuating tumor proved to be an overdistended bladder, par-

tially overlapping the uterus—the two organs not being in normal co-adaptation. As nearly as I could ascertain, the patient had not voided her urine in thirty-six hours, or longer. I at once tried to catheterize the patient, but failed. She was then thoroughly anæsthetized with chloroform, and all attempts to pass the catheter again failed. An operation upon the bladder was advised and readily consented to. The abdomen was cleansed with Johnston's Ethereal Antiseptic soap, an incision one centimeter long was made through the skin and fat with a small scalpel, a little to the left of the median line, moderately low down. A small silver trocar two m.m. in diameter was then thrust into the bladder, and two quarts of urine was drawn off. The use of so small a tube occupies some little time, but this is more than compensated for in the success that attends the use of small tubes. The trocar was removed, the external wound well washed with a five per cent solution carbolic acid, closed with a single carbolized silk suture, and dressed with a layer of iodoform gauze and borated cotton, held in place with strips of adhesive plaster.

The anæsthesia was continued, forceps applied, and the child delivered. The next morning I succeeded in passing a catheter and drew off the urine, after which there was no further trouble. The patient made a rapid and uninterrupted recovery.

The probable cause of retention in this case was an anatomical anomaly in shape of a double or bifurcated uterus, the right half being the recipient of the fœtus, which occupied very markedly the right side of the abdomen, and as labor progressed, the downward pressure being out of the normal axis, it produced a kink in the neck of the bladder, thus obstructing the flow of the urine and resulting in retention.

While the use of trocar and aspirator for many troubles is not the best practice, there are other cases in which free incision, the admission of air, and handling is equally bad practice. It would seem that in properly selected cases the use of a small aseptic trocar can not but be attended with the best possible results. Some care is necessary in performing this

operation. Like most other things, there is a right way and a wrong one.

(1.) The sight of the operation should be made perfectly clean. There is nothing better than Johnston's Ethereal Antiseptic soap. A similar preparation can be made by dissolving good castile soap in dilute alcohol, adding a little ether and your favorite antiseptic.

(2.) Your instrument should be aseptic. Dry heat is perhaps the best sterilizer, although a ten per cent solution of carbolic acid is good.

(3.) The sight of the operation is important. As a rule, the thinnest part of the abdomen and where the bladder is in direct contact with the walls, is the place to choose, and this should be low enough down that, as the distented cyst becomes emptied and contracts down, it will not detach itself from the trocar, in which case you would fail to completely empty the cyst, and, occurring before you were ready, might contaminate the abdominal cavity with the urine remaining in the trocar; all of which is avoided by puncturing low, holding the outer end of the trocar slightly below the puncture, and, if need be, a small piece of rubber tubing placed over the outer end of the trocar will, by gravity, remove the urine that might remain in the trocar.

There is absolutely no leakage through the walls of the bladder when the trocar is removed. The walls of the cyst being stretched when the puncture is made, the organ contracts, and its circular and longitudinal fibers having a different degree of contractibility, close the small puncture like a valve, the thick mucous coat slipping by the muscular coat.

Of the peritoneum, we must say, all things being equal, the danger of traumatic peritonitis is directly proportional to the amount or extent of injury it sustains.

SECTION ON SURGERY.

ESTABLISHMENT OF A PERMANENT ARTIFICIAL PERINEAL OPENING FOR THE RELIEF OF IMPERMEABLE ORGANIC STRICTURE OF THE URETHRA—WITH REPORT OF TWO CASES.

ST. CLOUD COOPER, M. D.

JEFFERSON.

MR. PRESIDENT AND GENTLEMEN—It is the purpose of this paper to call the attention of the association to a satisfactory method of dealing with those severe cases of impervious urethral stricture, complicated with extravasation, suppuration or urinary fistulæ, by establishing a permanent opening in the perineum for the purpose of micturition, and to report the result in two cases.

Mr. Bryant, in his Practice of Surgery, speaks very highly of this operation, and says that it is the only form of perineal section that ought to be performed in an impervious urethra, and that it is not sufficiently known.

He states that the operation was suggested by Mr. Cock, and is known by his name, and is thus described: "The objects aimed at in the operation can be accomplished, which I doubt if those of any other have ever fulfilled. However complicated may be the derangements of the perineum, and however extensive the obstruction of the urethra, one portion of the canal behind the stricture is always healthy and often dilated, and is accessible to the knife of the surgeon. I mean that portion of

the urethra which emerges from the apex of the prostate—a part which is never the subject of stricture and whose exact anatomical position may be brought under recognition of the finger of the operator.

"Thus, when we can not introduce a catheter by ordinary method, and even when we can not tap the bladder through the rectum, it still remains with us to *tap the urethra as it emerges from the prostate*, and thus effect the desired communication."

Mr. Bryant, continuing in the words of Mr. Cock, describes the operation as follows: "The patient is to be placed in the usual position for lithotomy, and it is of the utmost importance that the body and pelvis should be straight, so that the median line may be accurately preserved. The left forefinger is then introduced into the rectum, the bearings of the prostate are carefully examined and ascertained, and the tip of the finger is lodged on the apex of the gland; the knife is then plunged steadily but boldly into the median line of the perineum and carried on in a direction towards the tip of the left forefinger, which lies in the rectum. At the same time, by an upward and downward movement, the vertical incision may be carried to any extent that it is considered desirable. The lower extremity of the wound should come to within half an inch of the anus.

"When the operator has fully assured himself as to the relative position of his finger, the apex of prostate, and the point of his knife, the latter is to be advanced with a motion somewhat obliquely, either to the right or the left, and it can hardly fail to pierce the urethra."

With this brief description of the operation and the objects aimed at, I now proceed to give a short account of two cases, one operated on four, and the other three years ago respectively. These cases were reported in the New Orleans Medical and Surgical Journal three years ago, and the result of the operation has been so satisfactory to myself as well as contributing to the happiness and well being of the parties operated on, that I thought them worthy of report to this association.

CASE 1—On March 1, 1891, I was called to see Gilbert Gill, a mulatto, married, aged fifty-four.

Has been a sufferer from stricture of the urethra for the past twenty years. Was treated for a short time by dilitation ten years ago with some benefit. For the last year he has suffered off and on with a constant desire to urinate—passing urine in a very small stream. For two weeks past urine has been coming in "fast drops," with continual versical tenesmus.

Two days ago, while making violent effort to relieve his bladder, he felt something give way, and his bladder distension was relieved. That night and next day he suffered from frequent rigor and high fever. On examination I found the penis, perineum and right supra pubic region swollen and œdematous. The scrotum very much distended and gangrenous. He was delirious, with a temperature of 106 F., a quick and feeble pulse. It was evident that something had to be done quickly to prevent further septic absorption. Incisions were made in the median line of perineum and in supra pubic region, evacuating large quantities of urine and foul smelling pus. Necrotic portions of scrotum cut away, and all thoroughly douched with hot bichloride solution, 1/5000. Effort was made to pass an instrument into the bladder, without success—the smallest filiform bougie failing to pass.

For the next week or so his wounds were treated by thorough douching with hot bichloride solutions, the sloughing scrotal tissues left the testicles bare and hanging by the spermatic cords.

The urine passed through the numerous fistulæ.

March 12th—All wounds healing nicely, and patient very much improved. Several attempts at different times to pass an instrument into the bladder met with failure. On April 5th the perineum and adjacent parts were shaved and thoroughly scrubbed. The patient was put under the influence of chloroform and brought in the lithotomy position before a good light. Assisted by Drs. Stallcup, Foster and Armistead, I made an incision in the median line from scrotum to within half an inch

of anus, through all tissues down to where I supposed the urethra ought to be. No evidence of urethra could be found in the dense, indurated and cicatrical tissue.

A strong silk ligature was passed through each lip of the wound and served as retractors. The left index finger was then introduced into the rectum and apex of prostate located. The knife was then pushed upwards in the direction of the tip of finger, and entered the dilated part of the urethra, behind the stricture. The dilated open canal could be plainly seen at the bottom of the wound. A catheter was then passed into the bladder, followed by free flow of urine.

Simple attention to cleanliness, and in one month the parts had healed down to one large fistula, freely admitting No. 26 A catheter. He passes a large bougie now and then to keep the fistula dilated. Since that time, now four years, he weighs more than he ever did, enjoys splendid health, and has never been troubled by the pangs of a distended bladder; works at his trade, and earns full wages.

CASE 2—Nelse Holcomb, mulatto, sixty-five years of age.

Has had stricture of urethra for twenty-five years. Has had no treatment until lately. Sixteen months ago had perineal abscesses; had been confined to his bed for six months; is much emaciated and exceedingly nervous; is worn out by constant desire to urinate and loss of sleep; has taxed the patience and exhausted the resources of his friends, as well as those of his medical adviser.

On examination several urinary fistulæ were found; instrument passed two strictures of small calibre, the first three inches from meatus, the second five inches from meatus, and the third, which was formed in the membranous portion, was impassible to the smallest filiform bougie. In making this examination the patient had to be chloroformed, as cocaine did not seem to have any effect upon the exceedingly irritable urethral membrane.

On April 4th, 1892, assisted by the same gentlemen, the same operation was performed as in the preceding case, and, as in the

preceding case, the dilated urethra could be seen in the bottom of the wound. He rapidly gained flesh, and the cystitis subsided without any other treatment. At the present time he is able to do hard work; can retain his urine all night, is cheerful and feels like a new man. He was also given a large bougie to keep the false urethra open. Since these operations I have tried to pass an instrument through the old canal, but made no prolonged effort, as the patients were so well satisfied with their condition that they preferred to remain as they were. These patients micturate through the perineum, and consequently have to assimilate the position that the female does when performing that act.

The penis, while losing one of its functions, is still as serviceable as it ever was for sexual purposes; the power of procreation of course is lost. In conclusion, I will say that I do not know of any surgical procedure that is so satisfactory to both surgeon and patient as this operation, and would advocate its performance in cases of irritable stricture of small calibre, complicated with cystitis, if instrumentation was badly borne; for after the establishment of the fictitious urethra the bladder gets rest and the stricture would become more amenable to treatment.

DISCUSSION.

DR. WAGLEY: "I have had but one case, and in that I did perineal section. It was closed about six months afterwards by a St. Louis surgeon. After the operation, the man having no money nor place to stay, drifted to St. Louis."

DR. R. R. WALKER: "I would like to ask the doctor with relation to the subject, if the perineal wound and incision healed. That is, did they close of their own accord, or if he has made an attempt to close those wounds. Now, I have had some experience in the treatment of organic strictures, followed by urinary fistula. I have recently had three cases of perineal section for operation. There was one case in which it was impossible to pass any instrument, even the dilating filiform. There are very few of these cases. I think if the physician will exercise enough diligence, care and persistence, he

can nearly always go through with these filiform bougies, and then by the use of the urethral, in preference to perineal section. I will state that in the two cases where perineal section was done, they were done very nearly together—(it was about two months ago.) Both wounds to this day remain open. Now, the authorities, generally speaking, say that these openings will close up without much trouble. I have had a good deal of trouble, and have seen a great deal of trouble. The third case I had was a case I operated on last Monday. It was a case of urinary fistula, following stricture of the urethra. This I was able to get a filiform bougie through, and did internal urethrotomy. But the one point I wish to ask, is: What has been the experience of the physicians in the operation of perineal section? If it is their experience that these wounds close within a reasonable length of time. There is another point I wanted to add that the doctor didn't bring out in his paper, that is, the preparation of the urine, rendering it fully antiseptic before commencing any operation upon the wound."

DR. KING: "I want to submit a method of entering the bladder where it is not possible to do so through the urethra. I do not think it is safe to cut blindly through these parts, and I believe the method recommended by Dr. McBurny, of New York, is preferable in most cases. He recommends that where you can not enter the urethra at all, you do supra pubic cystotomy, introducing the sound, and go down to that and cut down upon it. I think this is preferable to cutting blindly and getting to the bladder through the perineum."

DR. COOPER: "The gentleman seems to have wholly misunderstood my paper. My paper advocates an operation for the establishment of a permanent opening in the perineum for the purpose of micturition, and for the relief of impermeable urethral stricture. This paper does not discuss urinary fistula, as some of the gentlemen who have entered into the discussion seem to think. You will find in the negro the worst kind of strictures, owing to his procrastination and neglect of person. This operation is called for in just such cases, the history of which I have given. These two cases were about as desperate as you could find anywhere, and since the establishment of one large fistula, the bladder is emptied with but little effort, and with complete satisfaction. It is true, they have to sit down like the female does when micturating, but they infinitely prefer to do this than be like they were before the operation. These men are now able to earn a living, and are perfectly comfortable."

TETANUS—WITH REPORT OF A CASE.

P. C. COLEMAN M. D.,

COLORADO.

The infectious nature of tetanus was well established many years before the discovery of the bacillus tetani. The older authors relate many cases showing their belief in this teaching. In 1853 Larger saw a woman who had received an injury to elbow by falling, while cleaning a farm yard. Tetanus developed four weeks later, and upon investigation it was found a horse affected with the disease had been in stable opening into the yard where she fell. Had this author been writing in 1884 instead of 1853 he could have accounted for the disease outside of the presence of the horse. This same author also mentions in a small village, where tetanus had not previously existed, five cases appeared in eighteen months, under quite different climatic conditions. Of these one had been taken to the hospital; after which two others in same ward became affected. In 1859 Betoli related a case of a bull that died from tetanus after castration. Several slaves died from eating the flesh of the dead animal. In 1870 Anger reported a case in a horse which had tetanus, after which three puppies which had been in the stable were affected.

In an article by Verhoogen and Baert, suggesting the probability of transmissibility of the disease and the likelihood of the agent of transmission existing in unclean instruments, Thiriar's experience is narrated. This operator was unfortunate enough to lose ten cases of major operations by tetanus before he determined the seat of infection to be in his hæmostatic forceps. The sterilization by heat was happily followed by a complete cessation of the undesirable sequences.

Above historical facts are taken from Sens' work on Surgical Bacteriology.

The microbic cause of tetanus was discovered almost simultaneously by Nicolaier and Rosenbach in 1884, the former finding a bacillus in earths, and the latter in the pus of a patient suffering from traumatic tetanus. The identity of the soil bacillus with that obtained from pus from wound of patient with tetanus, was demonstrated by the Japanese observer, Kitasato in 1887, who has since done much valuable work as a bacteriologist.

Rosenbach describes the bacillus as an "anærobic microorganism which presents a bristly appearance, with a spore at one end of its extremities, which gives it the resemblance to a pin or drum stick."

The experiments made by a large number of workers in this field, as given in recent literature, justify the conclusions reached by Verhoogen and Baert in the laboratory of physiology at the University of Brussels in 1889: "1. Tetanus is a specific infectious disease. 2. Outside of the diseased organism the specific germ may develop in the soil. 3. In addition, it may exist at different points on the coats of horses or other animals, in the dust of hay, on surgeons' instruments, etc. 4. These different situations (soil, dust, horse and man) constitute a closed cycle, from any element of which the bacillus may constantly or indefinitely emigrate, so that it is not possible to designate the point of initial departure."

Widenmann reports a case of tetanus in a child following a wound in the cheek, as the result of a fall on ground covered with horse manure. On the sixth day after the accident a splinter was withdrawn from the wound. Six days later tetanus followed, child dying four days later. The author inoculated mice and rabbits, with splinters of wood from wound, and with soil from ground where child fell. In each case he obtained typical tetanus.

Pla, of Havana, says of 4223 children born in 1889, 343 died from tetanus. This enormous mortality he ascribes to the fact that the umbilical cord is dressed with water from river Zanja,

which flows through a richly cultivated country and conveys quantities of drainage from certain quarters.

It would be useless to refer further to the many observers in support of the infectious nature of this disease. He who denies that such is true is placing himself in the position of shutting his eyes and refusing to see.

Kitasato, Tizzoni, Cantani and other experimenters have rendered, mice, guinea pigs and dogs immune by frequent inoculations with the tox-albumin.

Pathologists have failed to find characterictic lesions in tetanus, and those which exist, as has been suggested, are likely secondary. In most cases the nerves supplying the affected parts are inflamed. "Congestions occur in different parts and perivascular exudations and granular changes in the nerve cells have been found." (Osler.)

The disease usually sets in from one to two weeks after injury. It is, however, in some cases delayed longer, even as late as a month after injuries have been entirely healed. The muscles of neck and jaws are usually first affected; this is, however, not always the case. In one case I saw in a girl sixteen years old, caused by being thrown from a horse, these muscles were not prominently affected at any time. There is usually opisthotomus, but this did not occur in two out of three cases coming under my observation. *Risus sardonicus* is always present.

There is one symptom which I have noticed as very prominent, and is regarded as phathognomonic: "When the diaphragm is moved a sharp, sudden pain shoots through the body from ensiform cartilage." (Loomis.) The muscles remain hard and stiff even during remission in paroxysms. The intelligence is not usually impaired. Temperature may not be elevated. Death may occur during a paroxysm, from heart failure or asphyxia, or later from exhaustion. Strabismus is regarded by some authors as a symptom of grave import.

The mortality in tetanus may be placed at not less that eighty per cent.

J. J., age twelve years, was brought to my office on December

the 8th, 1894, by his mother, to have his foot dressed for injury which he had received a few hours before. While using an ordinary pick, the boy had driven it into his left foot, between the great and next toes, at metatarso-phalangeal articulation. From direction instrument went, and excessive hemorrhage, I concluded external plantar artery had been severed. I gave the mother an antiseptic dressing, and told her that when she returned home to put the boy in bed, and by no means allow him to be up until wound was entirely healed. I endeavored to impress upon her the great danger growing out of such injuries. I did not hear from the case for ten days, when I was called to see the boy, for what the family supposed was the result of cold, stiffness of jaws and neck. This condition had existed for two days, beginning eight days after injury. There was no difficulty in the diagnosis: Pulse sixty, temperature normal; unable to open mouth more than half inch; wound red, dry and inflamed, but from both exit and entrance it had been suppurating for past several days.

I learned the boy was only confined to bed for two days after injury, and as he complained of no pain, he was allowed to be up, frequently going to the stable yard in the rear of the premises, where, in the manure scattered around, the enemy was lurking, awaiting the victim.

Remembering the unusually favorable results obtained by Dr. George H. Lee, of Galveston, as given in his excellent paper read before this association in 1893, I at once began the administration of sulphate eserine in 1/60 of a grain, gradually increasing; so on evening of second day boy was taking 1/15 of a grain. It was given every four hours. I ordered hot application to foot, and dressed with bichloride solution 1 to 500. The eserine did not have any relaxing effect on muscles of jaws, and on night of second day produced intense nausea, followed in short time by excessive vomiting. The exhaustion was so great I feared immediate collapse. Up to this time muscles of other parts of the body had not been involved, nor had there been the characteristic tetantic convulsions. As soon, however, as re-

action was set up they came on, and involved the muscles of jaws, neck, abdomen, back and all the extremities, in the order named. There was distressing opisthotomus; patient, during paroxysms, resting only on occiput and heels when turned on his back. Deglutition was very difficult, and only liquids could be swallowed. Fortunately the boy had lost one of his front teeth a short time before, so a rubber tube could be inserted in his mouth, and in this way he was nourished throughout his illness for the first thirty days. It was impossible to get him to take other nourishment than boiled milk. I now began the administration of chloral and bromide of potassium, 15 grains each, every four hours. This was given day and night for two weeks. Fearing the cumulative effect, I decreased the dose and gave at greater intervals, but the paroxysms would be so much more violent and frequent I was forced to go back to the dose, and at expiration of two weeks to double it, giving thirty grains each every four hours, and sometimes oftener. I several times endeavored to substitute sul. morph. ¼ grain hypodermatically, but it did not control the paroxysms so well, and necessitated the drawing of urine by catheter, which always excited violent paroxysms. There was only slight elevation of temperature until the twenty-second day, when it went to 104 deg. F.; respiration very rapid and shallow, pulse 150; cyanosis of the whole surface, bathed in cold perspiration, delirium; unable to swallow; stimulants freely given by rectum. Constipation had existed from the beginning, and bowels only acted from enema. I gave calomel 6 grs. as soon as patient could swallow. Thorough action in four hours. Also gave phenacetine 5 grs. every two hours to control fever. For three days and nights life hung by a thread, and death was hourly expected. Respiration further obstructed by tympanites, which, in connection with muscular contraction, rendered the abdominal wall almost as hard as a board. Involuntary action, bladder and bowels. Not until the twenty-fifth day was there improvement in the case. The symptoms all gradually subsided, but it was seven weeks before boy wholly recovered.

TREATMENT OF TETANUS—The large number of drugs recommended, and the high rate of mortality, show how unsatisfactory has been the treatment in this most formidable disease. Owing to excessive exhaustion, a highly nutritious diet, with free administration of alcoholic stimulants, is called for. If impossible to feed by stomach, use rectal injections. Absolute quiet should be enjoined. The application to wound of a strong solution of bi-chloride of mercury should be constantly employed, and such surgical measures as may be indicated.

The indications for drugs or those remedies which quiet the intellectual centers of the brain and depress both sensory and motor sides of spinal cord: Sulph. eserine, has been successfully used by Dr. Lee as before referred to, and by others, but there is one serious objection to its use. So far as I have been able to learn, it produces intense nausea and vomiting in at least fifty per cent of the cases where it has been used.

The weight of authority is largely in favor of chloral and bromide of potassium.

Ranney, in his work on "Nervous Diseases," says: "Perhaps it may be said that large doses of chloral, combined with large doses of bromide of potassium, give as much relief to the patient as any known treatment. In tetanus poisoning it is the best remedy we have. In such a case it should be given in 20-gr. doses, combined with 60 grs. of bromide of potassium." (Hare.)

J. Lewis Smith, in his work on "Diseases of Children," speaks of chloral: "The remedy which in my opinion is far preferable to all others." M. Nicaise, of Paris, author of chapter in International Encyclopædia of Surgery on "Injuries of Nerves," uses the following language: "In the presence of a case of tetanus it is necessary to put the patient in the most favorable surroundings, and at once to administer chloral until resolution of spasms is obtained." I could give you many other authorities.

From my own observation, which has been limited to three cases, and from my reading, I conclude chloral is our most

valuable drug in the treatment of tetanus; and in its administration it is best to combine with bromide of potassium; for the reason, one lessens the reflex irritability of motor, and the other, sensory side of spinal cord. Give until you produce the decided chloralic sleep, which is to be kept up until the disease spontaneously disappears. We have no specific drugs in tetanus.

Given in this way you render the patient oblivious to the various sources of irritation which surround him, as well as lessen the force and frequency of the spasms.

While the journals have recently reported some cases of tetanus treated with toxine, the literature upon the subject is too meager to draw any conclusions.

In reply to letters of inquiry, Dr. N. Senn, of Chicago, writes, under date of March 5th, that he knew of no cases treated with toxine. Dr. Warren Coleman, of New York, of same date, says: "I am under the impression several spasmodic attempts have been made with serum therapy of tetanus, but I know of no systematic work."

DISCUSSION.

DR. BURROUGHS: "I believe the paper to be an excellent one. I have had a little experience in the treatment of this formidable malady and have tried a great many remedies, among them the old standard remedies, you all know. But I wish to detail a case to the point. I had a young man to apply to me whose hand had been lacerated very much by a gin, and on the third day, when I called to see this gentleman, he was suffering from opisthotomus tetanus. He was also fortunate enough to have a vacant spot from which a tooth had been extracted, through which I introduced repeated doses of chloral. We have many remedies, and most of us have our favorites. I am in the habit of giving medicine, not specially by doses, but for their effect. The patient was screaming from the top of his voice with clenched teeth, and of course I was somewhat off my base at first to know what to do with him. However, I thought of the chloral treatment and gelseminum. I had tried amyl nitrite, canabis indica, etc., etc., but they didn't satisfy me, and decided under the exigencies of the case to try chloral, pure and simple, in thirty grain doses. This seems to

be quite a large dose, but I prepared sixteen thirty-grain doses for this man. He was a very poor boy, and I had to leave this medicine to be given by an ignorant woman. Of course I was very much exercised regarding the safety of the patient. I left my watch for the medicine to be administered by. I said to the old woman, 'You give this boy one teaspoonful every hour until he limbers up and straightens out, then you stop and don't do anything more for him until I return.' I did not return until the next morning. I did not sleep any that night. I could not help but think of the safety of my patient. It was some distance from my house, but the question with me was whether I would find my patient alive or dead the next morning. So at daylight I rode over to see him. When I opened the door I expected to find him dead, but he looked up, opened his mouth, and says: 'Doctor, I am all right; I can open my mouth this morning.' Now, I gave that boy 480 grains of chloral from the time I left him until I returned. I asked the old woman to let me look at the bottle. She says, 'Oh, I gave him the last dose this morning at 4 o'clock, and he then limbered up, and I went to sleep.' But my boy was safe, and I simply desire to add this testimony to that most excellent paper. There were no return symptoms."

DR. HEAD: "I am glad Dr. Burroughs reported that case, for I have been feeling badly on account of one I treated precisely the same way. While residing in Laredo, Texas, I was called one morning to see a Mexican who had tetanus, and I put him on the chloral treatment. I went to see my patient and left the chloral in twenty-five-grain doses, to be given him every hour and a half, until I returned in the afternoon. I was a little late in going that night and had told the nurse to give the medicine until the fellow went to sleep, or limbered up and straightened himself out. In the afternoon, about 6 or 7 o'clock, I went down to see my patient, and when I got to the door I met the old Mexican nurse, and I asked her how John was. 'Oh! Juan es muerto,' she said, and I have always felt like my twenty-five-grain doses of chloral was what killed him. I am glad Dr. Burroughs reported that case, for I shall feel better hereafter."

DR. BURROUGHS: "The trouble is, you lacked just five grains of giving him enough."

DR. H. A. WEST: "I would like in this connection to report a case of puerperal tetanus where the trouble occurred subsequently to a furious post partum hemorrhage. In order to arrest the bleeding, all other means having failed, it was necessary to swab out the uterus with per-chloride of iron. This remedy was successful, but the patient was so collapsed from loss of blood, it was necessary to resort to transfusion. A thorough trial was made of eserine in connection

with hyperdermic injections of morphia and of bromide of potasium, with chloral internally, and the woman died. This case was of especial interest to me, as it was the only instance where I have observed tetanus followed labor."

DR. T. D. WOOTEN: "Doctor West inquired if any one had other cases of puerperal tetanus to be reported. I will state that together with Dr. McLaughlin, we treated a case of tetanus in a woman after confinement, with evidence of that fact that it originated with identical conditions as testified to in the first paper. This lady was confined in a lower room, which led into a horse lot, where there were a number of horses, and consequently manure and other filthy accumulations. We tried eserine pretty thoroughly, and finally found chloral served best, so we used that exclusively. We also moved her away and fed her regularly by the stomach, and after four or five weeks she completely recovered under the action of that remedy. I don't remember how many grains we gave her—thirty or forty-grain doses."

DR. WAGLEY: "In my case I took a little warm water and bathed off the bruise and disinfected it. That case ran its usual course of about three or four weeks, yielded to chloral and bromide. I used mostly chloral and a few hyperdermic injections of morphia."

DR. COOPER: "I would like to report a case I had; a case of a child about two years old, that swallowed a nail. I treated it with large doses of chloral by rectal injections. I supposed the child would die any way, because I was unable to get anything into its stomach. In about two weeks it got well, and at the end of five days passed a piece of a rusty nail."

ASEPTIC AND ANTISEPTIC TREATMENT OF BURNS AND SCALDS—REPORT OF A CASE.

T. J. WAGLEY, M. D.

CLEBURNE.

MR. PRESIDENT AND GENTLEMEN—I feel that I need offer no apology for bringing forward this subject today, as it is a part of surgical practice that is certainly very far behind that of any other branch, at least, in the practical application of the principles of recent surgery. I shall not attempt to deal with the subject of burns and scalds in a general way; and as it is my purpose to speak of their local treatment almost exclusively, it will be quite unnecessary to distinguish between those of the first, second and third degree. Nor will the local treatment be different, whatever may be the cause; whether fire, steam, fuming acids, caustic alkalies, molten metal, boiling water, or any other hot fluid. As to shock and the several complications that attend these injuries, such as those connected with the brain, respiratory tract and gastro-intestinal mucous membrane, I will merely state that I treat them upon the same principal as if they existed from any other cause.

The real object of this article is to insist upon a more careful attention to the aseptic and antiseptic management of the local injury or burned surface than it usually receives; for I claim that if we would save our patients from a great deal of unnecessary suffering, and the injured surface from becoming septic, we should attend to every detail of our cleansing, dressing and sterilization, as if we were doing an amputation or a laparotomy.

I am fully aware, gentlemen, of the fact that I am stating nothing new. All good surgeons recommend the aseptic or

antiseptic treatment of burns; but alas for the practice we witness daily. With an experience of about twelve years of railway service; with the care of four divisions of employes, who receive burns or scalds more or less serious, while out on their runs, and who are attended by the most convenient physician until they can be sent home, truth compels me to say that to have a a case returned to me with a well cleansed wound and a good antiseptic dressing, or what would be so considered for a lacerated or contused wound, is so rare that I can not recall one; and yet these are good physicians, that would not think of dressing other kinds of injuries otherwise than aseptically.

It is probable that if some of these cases had remained permanently under their care they would have received more scientific treatment; but this first dressing often determines the future course of the injury. Pneumonia, bronchitis, laryngitis, cerebral derangements and gastro-intestinal ulcerations, etc., are all the natural or usual results of serious burns, and no kind of local treatment can prevent them, and it is this class of cases that furnish the greater part of the mortality.

But I desire to emphasize the assertion that of the large majority that live and have to suffer, by proper local treatment we can prevent septicæmia, pyæmia, erisipelas, tetanus, etc., which furnish at least a part of the mortality, is the source of a great deal of suffering, delays healing, destroys large areas of sound tissue, rendering the parts more unsightly and increasing the deformity.

Now, I do not deny that there are some serious difficulties to overcome in carrying out the detail of rendering a burned surface aseptic. We are compelled to rely more on chemical and not quite so much on mechanical means as we do in ordinary injuries, on account of the pain given and the fact that the cuticle must or should be preserved as a covering; but with a plentiful supply of warm sterile water and a little soap, and afterward some antiseptic solution, with patience and care we can render the surface approximately aseptic and yet preserve the the cuticle where it has not already been destroyed. Should this

process be too painful it is better to anæsthetize the patient as we often do in lacerated and contused wounds, rather than run the risk of sepsis. As in other surgery, the hand of the surgeon and assistants, as well as the parts surrounding the injury, are to be rendered thoroughly aseptic. For my first dressing I generally use sublimate solution, 1 to 3000 for injured surface, and stronger for surrounding parts; then irrigate with sterile water where burns are extensive, in order to limit absorption of the antiseptic. After my first dressing I generally rely upon Thiersch's solution as being less irritating than any other antiseptic of equal merit. The first step, however, is to relieve the pain; not by smearing over the surface with all manner of oils, ointments, powders, etc., that are of very questionable value, and certainly are the means of conveying infection; but do it with opiates. Morphine, hypodermically, is by far the best, though I do not object to other anodynes; and I am fully convinced from actual experience that to render the surface aseptic, then lay over it perforated rubber tissue, and over that antiseptic cotton to absorb secretions, and secure with a light bandage, the patient will derive quite as much comfort from it at the time, and certainly a great deal more in the future, if infection is prevented, than from any of the so-called soothing applications.

As the same reason for leaving your dressings undisturbed for several days to secure early union would not apply to burns, I am in favor of frequent changing of dressings, especially in burns of second degree where there is always a free discharge of serum; for if left for a time it is difficult to get them off without removing the cuticle; and if allowed to remain until separated by the secretions your wound is more liable to become septic. Besides, to clip little holes in the cuticle and irrigate with warm sterile water causes a flow of serum, decreases the œdema and relieves the tension and pain; but usually some antiseptic solution should be used before re-dressing.

While my experience has not been extensive, I hope I may be pardoned for differing with those gentlemen who contend that it is impossible to make an antiseptic dressing that will not

be irritating. What I do claim is that it is possible to apply a local treatment that will be approximately aseptic and not more irritating than the routine powders and oily mixtures that have no claim to asepsis. Of course, that surgeon will succeed best whose ingenuity and tact is such as to enable him by close attention to every detail to make such soothing or emollient dressings as are necessary or possible, and yet use nothing that is not an antiseptic, or has not been rendered sterile.

While in the greater number of my cases I dress their burns very much as I do injuries from other causes, and exactly upon the same principle, there are cases that require special management, particularly where from neglect or other causes the injuries have become septic; where, for instance, there is considerable hyperæmia with heat and pain, cloth wet in sterile water and laid on in single layers to facilitate evaporation affords considerable relief; and while there are objections to the practice, even a flaxseed poultice made with boiling water, and therefore approximately sterile, can be used to soothe an irritated burn. I have often used caron oil, but always boil both the oil and lime water before mixing; even if the burn has become infected we must bear in mind that if we keep the injured surface, as well as the surrounding parts, aseptic, the patient will soon manage those germs that have already entered the system, and the injury soon returns to a healthy condition, for which Thiersch's solution is usually sufficient and is least irritating.

Finally, I must urge that there is no good reason why we should not treat burns and scalds upon the same surgical principle as we do injuries from any other cause; and when I read after any one of our most careful surgeons and note how he attends to every detail of his technique, sterilization of his water, instruments, sutures, dressings, hands of all assistants, then turn to the subject of burns and scalds in any of our latest text books, and see what an array of substances for local dressing are recommended, such as flour, molasses, starch, powdered clay, paints, varnishes, and many other kinds of powders and

ointments that have not a claim to asepsis, and without a suggestion that they should be sterilized, I am simply amazed. It is true that about all the late authors recommend the antiseptic treatment, but immediately after they suggest applications that are not aseptic; and I am sorry to say that while I do not doubt but that our best surgeons are doing good scientific practice, my observation of that of the profession at large has been that it is quite otherwise; referring, of course, to the treatment of burns and scalds. Not that they are not well informed and progressive physicians; the fault grows out of the rather general idea that it is impossible to make an antiseptic dressing that will not irritate.

Now, while my practice has been correctly given, it was for the purpose of illustration, and not to recommend any substance as the best dressing for this class of injuries. I desire only to contend for a principle and leave the individual surgeon to carry out the detail, guided by one invariable rule; when an application or dressing can not be rendered sterile, don't use it. All fluid dressings can be sterilized by boiling, and nearly all powders by long exposure to dry steam.

I am inclined to the opinion that all mechanical devices, similar to rubber tissue, that exclude the air, will not adhere very firmly to the surface, and can be removed at will for cleansing and disinfecting, will occupy a very prominent place in future for this class of injury. I am as yet undecided how far we can obviate the necessity of frequent changing by perforating the protective tissue for the discharge of the secretions. I will report one case that occured in my practice about two years ago.

R. H. D., fireman, aet. 26: On April 27, 1893, while on duty on a fast passenger train, the engine struck some loose horses and was ditched, rolling over on the engineer and fireman. Both were seriously scalded by the boiling water and escaping steam. The engineer died in a few hours, and the fireman, the subject of this report, came under my care on the following day. He was scalded over the entire head, face and neck, over the back and chest as low as the waist, and over the whole circum-

ference of both arms and both hands. When I first saw him every square inch of integument over the parts mentioned was covered with vesicles of various sizes, and, as appeared later, nearly the entire thickness of the integument was destroyed in several places on the scalp, in one place on the lower part of the neck and on one forearm near wrist. The tissues beneath the entire burned area, but more particularly of the head, face and neck, were enormously swollen, the patient presenting no resemblance to his former self. The eyes were entirely closed, face and arms were yet covered with dirt.

After making him perfectly easy with a full dose of morphine, I proceeded to cleanse the parts, using warm sterile water and a little soap; then bathed with sublimate solution, 1 to 3000, and again with sterile water, to remove any excess of the sublimate solution to prevent its absorptions; then covered all the injured surface practicable with antiseptic gauze, and left instructions to wet with sterile water any part that became dry and tense. Dressings were removed twice daily, and holes were cut with a pair of scissors in the vesicles or bullæ, which allowed the serum to escape and the irrigating fluids, first the sterile water and then Thiersch's solution, to flow under the cuticle, cleansing and disinfecting the parts beneath. Owing to the extent of the injury the process was tedious and not without considerable inconvenience to the patient, but the œdema was perceptibly lessened each time, and it was followed by several hours of real comfort.

During the first ten days the temperature ranged from 99 to 103, returning to near normal at the end of that time. Caron oil was then used to avoid such frequent dressings, having first boiled both the oil and the lime water before mixing. It relieved the dryness and prevented to some extent the dressings from adhering. The injury was disinfected daily until a new cuticle had formed. At the expiration of eighteen days he was virtually well, was allowed to go about the room, and in a short time was on the streets. All the injured parts had healed, except some deep burns on the scalp. Being absent from the state I did not

see him again for several weeks, when I found the scalp wound had become septic. I sent him to the hospital, where his injuries healed completely, but after quite a long time. However, he was never confined to his bed again. I did not have the rubber tissue at the time, and feel somewhat doubtful about the practibility of utilizing it with this patient.

The result of this case is of interest when we consider the extent of the burn, the severity of the symptoms and the remarkable absence of scars, except in those places mentioned that were deeply burned, due, as I believe, to my antiseptic treatment that prevented the injuries from becoming infected until nearly all had healed; or, if the fever be considered as an evidence of septicæmia, caused them soon to return to a healthy condition.

The only one of those filthy looking dressings in common use that I have employed is caron oil, and while it seems to supply a need for an application or covering for parts like the face, to which it is inconvenient to apply a fixed dressing, and in a class of cases that are so simple that the surgeon does not care to take the trouble to dress carefully, yet I believe we can very well dispense with it altogether.

DISCUSSION.

DR. O. L. WILLIAMS: "As the doctor has truthfully said, there is no reason why burns and scalds should not be treated antiseptically, as are wounds. For several years I have adopted the antiseptic treatment as published in Gerster's well known work on antiseptic surgery in all these lesions, and find it admirably adapted for such cases. After thoroughly cleansing the burned area and contiguous parts with soap and water, with sterilized gauze and a sublimate solution 1 to 1000 go over the entire surface. Then cover the burn with sterilized oil silk; over this iodoform gauze, and after this absorbent cotton with bandage. Remove dressing in four or five days, and dress as before, omitting the sublimate lotion, as the burn surface is already aseptic. Two dressings are ordinarily sufficient. I have treated children by this method, and had the satisfaction on returning next morning to find them playing with their toys, free from pain or discomfort,

and so remained until discharged. I can not speak too highly of this treatment."

DR. KENNEDY: "Thirty-five years ago I was called to see a beautiful young lady who had been badly burned. There was an old lady present who had a big heart, and she told me to apply turpentine and it would cure it—spirits of turpentine and the yellow of an egg applied freely to the burn. I have found that under this treatment the patients have gone right to sleep. I dress the burn about every other day."

SECTION ON GYNECOLOGY.

REPORT OF CHAIRMAN, J. E. GILCREEST, M. D.,

GAINESVILLE.

MR. PRESIDENT AND GENTLEMEN—Knowing that we have many valuable and interesting papers to be read and discussed by this section, I have deemed it best to be as brief as possible with my report. I shall not attempt to bring all that is new in this field before you, as it would take more time than I wish to consume.

This department has kept apace with the other branches of medicine, and many improvements have been made in the last year. Statistics show a decline in the mortality of nearly all operations in gynecological work. Hysterotomy that was a few years ago considered a very formidable operation, is now done by experienced operators, with favorable surroundings, with a mortality of from two to five per cent. Hysterotomy is now often done when the diseased appendages require removing and the uterus is also diseased, and the results have been with most operators highly satisfactory. The ground taken for the radical operation is that the danger is only slightly increased, and after the appendages are removed the uterus is useless and only a place to still harbor the germs of disease. But the methods we now have of treating the diseased uterine cavity, which have been ably presented to this association by one of my predecessors, is still gaining favor. I refer to thorough curetting and packing the uterine cavity. This is one of the best methods we have of curing endometritis; but, like all good things, it is very much abused by some.

The increase of female diseases and infirmities are recognized by all observing gynecologists. The question now arises: What can we do in the way of prevention? This has been often spoken of by medical men, but no means have been devised by which any action could be taken.

Much has been said about the faulty methods of our present system of education. All agree that the average school girl is crowded with brain work, and her physical training, which is calculated to make her a strong and healthy woman, almost entirely neglected. See the graduating classes of our high schools, seminaries and boarding schools, and a large majority of them come out ready to go in the hands of the doctors. These evils are too well understood by the profession to require further comment.

I think our efforts should be to educate parents, teachers, superintendents and school boards the necessity of more physical and less mental training in young girls. Unless something can be done in this direction the gynecological field will become more and more fertile.

The majority of girls are anxious to graduate young and get out of school, and this is encouraged by the advocates of the so-called high culture, and they champion the idea of the intellectual equality of sex, and the result is that too much brain work and too little body work is the great evil of our country. The fact is our girls are over-educated. Forcing that portion of the brain which is the seat of our intellectual faculties, and especially during its growing and nascent stage, stunts these centers, which preside over animal life. Thus energy is withdrawn from the reproductive centers and physical development arrested. We are consulted much more frequently by the champion of classes than any other member of it. When I hear of a girl that stands highest in her class and graduated with the highest honors, I look for a physical wreck, and generally find it.

We should advocate and do all in our power to lengthen the time of educating girls and give due attention to physical training during early school years, and not sacrifice their healths on

the altar of high education. If we can do this, we will see young women who are more able to cope with the duties of after life.

One of the greatest evils among our young married women is the unwillingness to become mothers. They will marry, and at the same time be determined not to have any children for a few years. They think if they happen to get caught, as they say, all they have to do is to call in a doctor and be relieved. A young married man called in my office several months ago, and asked me what time I could go to his house. I told him I could be there at a certain hour, or sooner, if necessary. He took out his watch and looked at the time, then said: "That will do. My wife has missed her sickness this month, and we think she is pregnant, and I want you to come over and take it away. We do not want any children yet." When I told him the danger to his wife, and the magnitude and penalty of the crime, he seemed amazed, and said he had not looked at it in that way; that he did not suppose there was any danger or harm at that stage. But he took my advice, and now they dote on a nice baby boy. I have wondered how they reconciled their conscience when they think of the day they had set to put him to death. Though I am amazed at the very low standard of morality obtaining in the community on the sexual relations. So low indeed has it fallen that physicians of repute teach their patients how to sin. To these detestable practices of preventatives and abortions much of the general ill health of our women may be attributed. We should condemn in the severest terms all such practices, and scorn all medical men who stoop so low as to follow that work of iniquity.

Another great cause of female suffering is gonorrhœa. This is too well understood to need any lengthy elaboration. Physicians can do much to prevent this if they would always make it a point to explain to young men, when prescribing for their gonorrhæa, the great dangers they would subject a lady to if they married without being perfectly cured. It is well understood that chronic gonorrhœa in the male causes a large amount of the tubual and ovarian diseases in the female. Gleety discharges

that have existed for years, will often propagate the disease to the female; not in an acute form, but a more dangerous one in the form of chronic salpengitis. Men are inclined to regard gonorrhœa as a very trifling matter; often say it is not more than a bad cold. If we would educate them to the great danger of this disease to the opposite sex, we would do much to prevent the suffering of many fair and innocent women.

THE PATHOLOGY OF CYSTIC TUMORS OF THE UTERINE ADNEXA.

WM. H. WATHEN, A. M., M. D.,

LOUISVILLE, KY.

Cysts in the uterine adnexa arise in the ovary, the hilum of the ovary, and in the parovarium, and are designated oöphoritic, paroöphoritic, and parovarian cysts.

Oöphoritic cysts arise from the follicles in the egg-bearing segment of the ovary; paroöphoritic cysts arise from the remnants of the Wolffian body in the hilum of the ovary, and parovarian cysts from the tubules in the parovarium, the remnants of the vertical tubules of the Wolffian duct.

It will thus be seen that with the exception of oöphoritic cysts all cysts of the uterine adnexa arise in fœtal remnants that serve no useful purpose to the woman.

Until recently the etiology of all these cysts was supposed to be identical; hence the difficulty in appreciating the correct operative procedures necessary in their removal. Oöphoritic cysts are nearly always multilocular, generally have intracystic glandular growths, and I concur in the opinion of J. Bland Sutton and others that they arise in Graafian follicles, undergoing retrograde processes of development. In large cysts the wall is entirely fibrous, but in the smaller cysts the tumor is lined with stratified epithelium, and when very small, by the membrana granulosa.

While in unilocular cysts the disappearance of the epithelium may be universal, in multilocular cysts of long standing abundant epithelium may be found lining some of the loculi.

Oöphoritic cysts may be unilocular, but I am impressed with the belief that they are primarily or at some stage of their exist-

ence multilocular, the partitions or walls of small cysts having been destroyed. Many of the so-called ovarian unilocular cysts are parovarian cysts. Some of the loculi in multilocular oöphoritic cysts may be small, while others are as large as a melon. They are filled with viscid fluid identical in physical character with mucus.

Unilocular and multilocular dermoid cysts also arise in the ovary and may contain one or all of the following characteristics, namely: Bone, teeth, hair, sweat glands, sebaceous glands, horn, mammæ, unstripped muscle, and tissue histologically identical with brain matter; hair, teeth and bone, however, being most frequent and most abundant. The teeth are usually found embedded in loose bone, resembling alveolus, and are developed on the same plan as teeth in the normal situation; they may be few or many.

The bones found in dermoid tumors and in extra-uterine pregnancy should not be confounded, if we remember that no well-defined bone of any part of the human body is developed in a dermoid growth.

Oöphoritic cysts are nearly always pedunculated, dermoid cysts less frequently so, and they are sometimes found deeply embedded or adherent in the pelvic structures.

These tumors, in timely operations, can usually be removed without difficulty, but the dangers multiply by delay, which causes complications that render the operation difficult and often fatal, namely, adhesions to the omentum, the pelvic structures, the abdominal walls, the intestines, the mesentery, the liver, the spleen, and by pressure disease of the kidneys; they may suppurate or cause pyosalpinx or pelvic abscesses.

As parovarian cysts arise in the cœcal tubes of the parovarium which lie in the folds of the broad ligament, these tumors are necessarily in their early stages intraligamentous, and while they usually ascend above the pelvis and form a pedicle, this is not universal, and in some instances well developed parovarian cysts may be apparently as completely intraligamentous as are cysts of the hilum of the ovary. The union of the cyst wall to

the investing capsule, however, is not firm, and the tumor may be easily enucleated without injuring any viscus, and without extensive hemorrhage.

These tumors are generally unilocular, of slow growth, do not form adhesions rapidly, and may continue for many years without serious inconvenience to the patient. They are more easily removed and the mortality is lower than in the removal of any other tumors of the uterine adnexa.

The reverse is true of tumors that arise in the hilum of the ovary, for these cysts unfold the layers of the broad ligament, burrow deep into the pelvic and peritoneal connective tissue, and may become so intimately blended with the adjacent structures as to be almost a continuity of structure—the uterus, ureters, bladder, deep pelvic vessels and intestines.

It is sometimes impossible to enucleate these cysts from the investing capsule without injury to the ureter, bladder, blood vessels or intestines. The ureter has been found lying in front of the tumor between the wall and the capsule, and has upon more than one occasion been divided in making the incision through the capsule.

The cyst may separate the peritoneum anteriorly from the abdominal wall, or separate it posteriorly, opening the meso-rectum, the meso-colon, the mesentery of the small intestine, or pass under the cœcum and ascending colon.

We sometimes find a net work of vessels the size of goose quills coursing over the capsule of a large embedded cyst of the hilum. This condition is especially well marked where the tumor has unfolded the mesentery so that the bowel lies directly in contact with the cyst wall.

These tumors never have a pedicle and cannot be removed except by enucleation of the cyst wall from its attachment to the capsule and other structures, always being careful to avoid wounding the ureter, the bladder, deep seated vessels or intestines. The operation may be as difficult as any in surgery and should not be undertaken by anyone except an experienced abdominal surgeon; otherwise the patient may die on the oper-

ating table or from accidents because of ignorance of the correct technique.

As I do not wish to consume the valuable time of your society, I will conclude with the report of one case, selected from many, to illustrate the dangers of delay in operating for tumors of the uterine adnexa; the necessity for timely operations applies with equal force to other pelvic and abdominal diseases.

While there is too much laparotomy done and too many men are doing this kind of surgery without proper training, there are nevertheless many excellent physicians who advise patients not to be operated upon until conditions or complications have arisen that add greatly to the dangers of the operation and may cause the death of the patient.

I operated on Mrs. N., Salem, Ind., ten days ago, with the following history: Thirty-nine years old, married, the mother of six children, the last ten weeks old. Two years ago she noticed a tumor in the right inguinal region which had slowly but continuously increased in size until she came to the Kentucky School of Medicine Hospital for operation. Since the birth of her last child the tumor has enlarged more rapidly, and when I first saw the patient the abdomen was as large as in pregnancy at seven months. For six weeks she had but little desire for food, and her digestion and assimilation have been bad; her weight, deducting the weight of the tumor, did not exceed eighty pounds. She suffered severe pain in the abdomen, her temperature varied from 100° to 103° F. and her pulse from 110 to 125. When the abdomen was opened the omentum immediately under the incision was found firmly and broadly adherent to the abdominal and the anterior surface of the tumor. Upon separating the adhesions from the wall an opening was found in the cyst from which was discharged nearly two gallons of pus containing a bunch of hair as large as the fist, thus showing the cyst to be a suppurating dermoid. The omentum was so extensively and firmly adherent to the cyst wall that it was necessary to ligate it in sections and remove it near the bowel. The cyst was then found to be adherent to the ilium, the sigmoid

flexure of the colon, and to several parts of the mesentery, necessitating prolonged and careful dissection to remove it and prevent fatal injury to these vital structures. After thorough irrigation with hot sterilized water the incision was closed and she was removed from the operating table with a pulse of 140, but suffered no severe shock, and in forty-eight hours her pulse was seventy-five and temperature normal; she passed gas in thirty-six hours, has had no untoward symptom, and will make an uninterrupted recovery. The suppuration was probably due to traumatism during labor, and but for the omental adhesions the woman would have died from diffuse suppurative peritonitis, and had she delayed operation a little longer, rupture would doubtless have occured notwithstanding these adhesions.

VICARIOUS MENSTRUATION.

J. W. CARHART, M. D.,

LA GRANGE.

Menstruation is a discharge of a sanguineous fluid from the female generative organs, occurring at more or less regular intervals, and continuing from three to five days. It should take place monthly, that is, once in twenty-eight days.

The source of the discharge is said to be the body of the uterus, but there is reason for doubting the correctness of this theory. It is a well settled fact that it is not due to a congestion or to an erection of that organ, but, as is supposed, to the degeneration, disintegration and removal of the so-called mucous membrane of the uterus—the decidua menstrualis.

The ultimate cause of the discharge is supposed to be the separation of ova. But this theory seems not to be well founded, for menstruation does take place without the discharge of an ovum, and, on the other hand, ova may be separated from the ovary without the occurrence of menstruation.

It has been claimed that the function is due in some way to the ovaries, and that their removal causes menstruation to cease. There is no doubt but that in most cases of the removal of both ovaries menstruation is terminated; at the same time, there are a number of well authenticated cases on record of the thorough removal of both ovaries, in which menstruation continued regularly. It would therefore appear that whilst the ovaries may be regarded as a subordinate cause, they are not the sole or primary cause.

That the phenomenon of menstruation is yet surrounded with considerable mystery there seems to be no question. I think the part played by the nervous system in the function of menstrua-

tion, is coming to be more clearly and generally recognized by investigators along this line. It is not my purpcse to deal, in this paper, with any of the forms of disordered menstruation, except what is known as vicarious menstruation. The word "vicarious" signifies substitution, and in physiology and pathology implies that some part or organ performs certain functions or is morbidly affected instead and in the place of some other part or organ, thus becoming a substitute for it. This idea of vicariousness is not, by any means, confined to the functions of the womb in menstruation. In bleeding piles a hemorrhage from some other organ or part of an organ may take place to the relief of the pile tumor. Thus a congestion in one part may be relieved by a congestion or inflammation elsewhere.

It has been frequently noted that in cases of suppressed menstruation there has been bleeding from the nose, or from the stomach, or from the throat, and instances are recorded of hemorrhage from the eyes, the ears, and even the umbilicus, in cases of suppressed menses, and it is believed that such bleeding was in place of the usual hemorrhage from the womb, and therefore properly called vicarious menstruation.

My object in presenting this paper is to call attention to and put on record a case of menstruation from the bladder. I have carefully examined all the literature on the subject of menstruation and vicarious menstruation within my reach, and it has been considerable, and I have been unable to find a similar case. I have conversed with a number of the members of this association in regard to my case, and not one of them ever heard of such a case before. In view, therefore, of the singular interest of the case, I concluded to report it somewhat in detail:

On May 12, 1894, I was called to see Mrs. G., a lady of German parentage, and about twenty-three years of age; married, and the mother of one child about nine months old at the time of my first visit. She appeared to be of an extremely nervous temperament, but during her girlhood and until a month or so after the birth of the child, had enjoyed good health. Her mother was of nervous temperament and rheumatic. Her father was a

teacher of unusually bright intellect, of extremely nervous temperament, and died about eight years before the time of my first visit. At the birth of her child, labor was somewhat tedious, but no instruments were used. She made a usually good recovery from her confinement, and about two months thereafter she voided small clots of disintegrated blood after urinating, followed by or accompanied with severe pain. The attention of her physician being called to the matter, he told her and her husband that it was due to "constricting bands in the urethra," and he accordingly passed large steel sounds to break up the constrictions. There had never been, at any time, any difficulty in passing urine, and no retention of urine. The passing of the sounds gave her great pain, and she was worse thereafter.

After varied treatment for seven months, during which time her sufferings at times were intense, her husband had decided to take her to Dr. Herff, of San Antonio, for treatment, and for operation, if thought necessary.

Just at that time I went to LaGrange, and the case came into my hands. I expected to find carunclæ of the urethra, or a urethretis, but found only slight inflammation of the urethra, and two very sensitive papillæ at the meatus urinarious, which I excised. It occurred to me that possibly a false passage through the mucous membrane might have been made by the passage of the steel sounds, but examination revealed no such passage. There was slight cystitis which readily yielded to treatment, and I thought my patient cured. But, to my surprise, in the course of time I found her passing blood again and in paroxysms of pain that nearly threw her into spasms.

The periodicity led me to the conclusion that malaria was at the bottom of the trouble, and on consulting Aitken I found a case which seemed similar to mine, which Aitken said was of malarial origin. I accordingly put my patient on anti-malarial treatment and she improved and seemed in a fair way to recovery. I sent her out into the country, to a high and dry place, and she did nicely. In two or three weeks she returned much improved in health every way. In a week or so, however, she

had another attack, worse than ever. I was compelled to inject morphine to prevent spasms.

I tested her urine early in the course of my treatment, and found albumen. This I attributed to the blood present in the urine. I put her on gallic acid, one grain, three times a day, and she got worse. The next attack she had I gave her ergot and that made her worse.

I concluded from the awful paroxysms of pain, that she must be passing gravel, and I accordingly put her on alkalithia. I found some very fine grit in the urine, but it proved to be oxalate of lime, and had its origin in the bladder in consequence of blood there. The next attack she had led me to wash the bladder a number of times with a hot solution of permanganate of potash. She got better and I thought I had cured her. Shortly, however, she had another attack, and thinking there were fungoid growths in the bladder, and that she would have to be operated on, I wrote to Dr. J. F. Y. Paine about her case, and to know if I could bring her to the college clinic for operation, and he did not answer my letter. I then looked up the literature on the subject of operations for fungoid growths of the bladder, and in both Ashhurst and Pepper the mortality record was so great that I was afraid to undertake it. Finding that one had been cured, as was supposed, by the injection of hot water into the bladder, I adopted that treatment, and my patient seemed to get well again, but in twenty-eight days she had another attack. It then dawned upon me that it might be a case of vicarious menstruation, and I explained to them that whilst I had never read or heard of such a case, it was still possible. I accordingly ordered a small chloride of silver, dry cell battery, and instructed them how to use it in the pelvic region, and noted carefully the time of the commencement of the last attack, and in twenty-one days from that time I gave her tablets containing Ergotin, 1 gr.; Dried Ferrous Sulp., 1 gr.; Extract Hellebore, 1 gr.; Aloes Soc., 1 gr.; Ol. Savine, ¼ min.; Ext. Cotton Root Bark, 1 gr. One three times a day, until the bowels were thoroughly opened. At the proper time she had her menses, with but slight discharge

from the bladder of disintegrated blood and but little pain. She continued the use of the battery every day, and in twenty-one days she commenced the use of the tablets again—came sick regularly, without pain, and without any blood from the bladder. She has had no trouble since—remains well, is in fine spirits, and as active as one can well be.

MENSTRUAL DISORDERS IN SCHOOL GIRLS.

J. T. WILSON, M. D.,

SHERMAN.

A disturbance of the menstrual function in girls who are attending school, is a frequent occurrence, more specially do we find this the case with girls who reside at the boarding schools; and the most frequent character of the disturbance dysmenorrhœa. Next in frequency is a suppression of the flow. While menorrhagia is comparatively rare at this age, yet it does sometimes occur and may be severe.

The physical development of girls previous to puberty, is very commonly neglected; but little attention is given to the proper selection of diet, exercise, clothing and sleeping hours. To this neglect is due, in many cases, these functional disorders which too readily give rise to well established and permanent diseases.

If the physical system of our girls was expanded by a healthy growth in the three or four years previous to puberty, and the same length of time following it, their minds receive such culture as would conduce to healthy development of the brain and a training that would tend to systematize and fix habits, at the critical time of puberty, the epoch would be established with less shock to the system and without a nervous explosion; we would have fewer sickly, delicate girls, less hysteria, insomnia and disturbance of the menstrual function. If under trying circumstances these troubles should arise, there would be less difficulty in rectifying them.

In our boarding schools, even in our best and richest colleges, are found a considerable per cent of pupils suffering from some form of menstrual disorder, with morbid or lost appetites, constipated bowels with its frequent accompaniment, dyspepsia and

insomnia to a more or less degree, headaches, backaches, sallow complexion, flabby muscles, an acne eruption, anæmia and leucorrhœa.

There are a combination of causes for this state of health. It is generally about the age of puberty that most girls take up their residence at boarding schools. In the majority of cases there has been no attempt to develop their muscular system, no control of appetite, no selection of diet. They have been permitted to eat anything to which they had taken a fancy, and rarely dressed with that degree of judgment necessary for her protection and conducive to health. She has had no instructions in female hygiene, and though she may appear rosy and healthy, she does not possess the muscular solidity, the mental control, and the ready adaptability to surrounding circumstances, so necessary to resist the mental and physical changes through which she must pass. There has been no restraint upon her actions and no systematizing of her habits.

We should not forget that the nervous system maintains over all the organs of the body a dominating and controlling influence, and is brought into its greatest activity about the age of puberty. When the girl begins to develop, her physical and mental being changes, as well as her character and habits; her emotional system is most impressionable.

The out-of-door sports and romps to which she has been accustomed are prohibited; she is told they are not suited to her age and position, hence she must be confined indoors and her complexion bleached; that her figure must be changed, and she is moulded out of shape with a tight corset, diminishing her size to one-fifth or one-third. Around this are tightly tied and hung several heavy skirts, compressing the heart and pushing it up out of place, squeezing the liver, interfering with the portal circulation, displacing the stomach, disturbing the digestion, dragging and pushing down the abdominal and pelvic organs, producing congestion and displacement, interfering with their functions, arresting the development of the body, embarrassing respiration and productive of hysteria. She assumes unnatural

postures, abnormal gaits and awkward and painful movements of the body generally; her feet are encased in shoes ill shaped and several sizes too small.

This is the most important period of her life, a time in which she is subject to most changes, the system is more susceptible to disturbing influences. It is a time when trivial impressions may leave indellible tracings, when the foundations of future health or disease are laid, and thus she leaves her home, probably for the first time, to remain away from her mother's oversight, enters school. Here she meets changes new to her on every hand; she is among strangers, thrown, to a great extent, upon her own responsibility, is subject to the routine diet, badly cooked it may be. Crowded into a small, ill ventilated room with several companions, begins her daily life, having assigned to her from six to ten studies in addition to music and art. She is required to rise at an early hour for breakfast, then the greater part of the day is spent in the recitation room and study hall with several hours at the piano—which is nearly as bad as operating a sewing machine—inducing ovarian and uterine congestion. She neglects her daily functions, and then begins her troubles.

Our American girls are pampered and petted and spoiled from their very infancy, and at the critical time of life, with all the disadvantages of dress, diet, habits, impatient of control and ignorant of the functions of their sex, or have been taught too much and misinformed about them, are rushed into society, or placed in boarding school and crammed with the full curriculum of the college. Her parents and friends expect her to graduate with all the honors in an incredible short time. She must enter the contest for all medals, must be most conspicuous at all the many daily and nightly exhibitions during commencement week. This nervous strain, rush and mental activity, the constantly conflicting emotions, the continual brain tension from all this excitement will react on the other organs of the body, and the breakdown will be very apt to come sooner or later in most cases. The foundation is thus laid for a life of invalidism. The tissues

and ligaments of the uterus are relaxed, and there may be displacement, and the nervous tension may cause hyperæmia. The consequences are weak backs, diminished muscular tone and nutrition, digestive ailments, loss of or morbid appetites, habitual constipation, cold feet, painful or disordered function or complete suppression. So common is this cessation in boarding schools that teachers, in many instances, look upon it at immaterial and unworthy of consideration, and are ignorant of the dangerous sequences. Then follows a train of a varied character of nervous symptoms and hysterical attacks. After all this mental strain, all this dash and emotional excitement, all this cramming of the ordinary literature of the day, of the classics, of music and painting and elocution, and almost the entire day confined in class rooms, what have we left? In many cases almost a physical wreck, a mental egotism, and a superficial, impractical education, illustrative of the fact that "a little learning is a dangerous thing."

Improper clothing, badly cooked food, insufficient sleep, too many hours at study, too many hours shut up in the class rooms, and thumping away at the piano with hands and feet, while the nervous system is strung up on a high key, with the effusive sounds of the instrument vibrating through the brain, and the teacher's voice shouting out the numbers and making a correction; with a neglect of, or ill advised physical culture, too little recreation; at the end of the term a week of exhibitions, of concerts, of late hours and loss of sleep, requiring renewed exertions and borrowing a stimulus from the increased excitement, with which to keep up. Is there any wonder that discordant notes should creep into the execution of an operatic piece? Is there any wonder that menstrual disorders, nervous prostration and neurasthenia should result?

And when the time comes for her to assume the duties of true womanhood—to become a mother—she is in no condition to pass through the ordeal of that physiological process with ordinary ease and safety; is in greater danger of suffering from the accidents consequent upon it.

The peculiar organization of woman is too much ignored, and she herself is not taught the necessity of care and discretion at her periodical epochs. At the schools too many studies are imposed upon them, or permitted at their own solicitation. The number of years set apart for the finishing of the course are too few. During the term they spend too much time indoors, striving to win the medals, to keep up with her more gifted sister in literature, art, music, etc., stealing the necessary hours from sleep, till past the midnight hour, straining her eyes by a dim light half concealed, for fear of being discovered, preparing for a brilliant exhibition of her talents at the commencement exercises. All this cramming and excitement, pomp and parade at the public commencements, is not so much the fault of the schools as it is of the parents who demand it, eager to see their daughters take a conspicuous part in the role, and yielding to the gratification of the parents, these daughters spur the jaded and overworked system, to excel in their special parts, and this at the expence of nerve force and body waste.

When this change in the young girl is established—sometimes with an effort—usually no notice is taken of it, no modification made in the habits and modes of life; it is always a delicate period, these monthly returns; always a time of some excitement and weakness, and change of disposition, but ordinarily no rest, mental or physical, is allowed; no recreation, no quietude, but little heed given to this periodical act of nature's expression of womanhood; no attention paid to the susceptibilities and mental perversities that accompany it. I elicited the following expressions from Prof. Geo. J. Engelmann, in his presidential address to the Southern Surgical and Gynecological Association: "Among our social customs there are many which have wrought injury to woman. I can not even touch upon all these. There is but one of which I shall speak, and that the most dangerous of all, more or less underlying all other causes of ill health. It is the ignoring of the functions of woman by woman, by the mother, and her ignorance of its import."

The digestion of a majority of school girls is more or less af-

fected. The diet is not always selected, frequently can not be with the care that it should be, and often the cooking is most lamentable. Too much fried greese, hot bread, tea and coffee, rich pastries, and too much sweets, are allowed to supplant the well cooked, more easily digested, substantial articles of food, with good nourishing qualities. The stomach is turned into an experimental chemical laboratory, into which a great variety of incompatible substances are emptied to insult or vex that much abused organ. When the time comes round for her periodical function, her brain is overworked, her body is exhausted, her nervous system irritated, and her flow comes on with much effort, amid pain and distress, or fails altogether. She is without the care, advice, sympathy and soothing encouragement of a sensible mother, so grateful and helpful. Is it any wonder that the poor child gets homesick, is unable to sleep, and sometimes worries and frets herself into a fever? After the commencement, the graduate returns home, her brain crammed with literature, her mental vision sated with art, her ears ringing with music, her body sickly, puny and weak, with its flabby muscles, its overstrained nervous system, its digestive disorders and menstrual disturbances, unfit for the duties of domestic life, unfit for the high mission of womanhood.

Very rarely do we hear of any trouble of the sexual system until after the period of puberty, but the foundation for such diseases is often laid in early life, by the neglect of the physical system and the necessary training. There is often an hereditary feebleness of body that should be trained, developed, strengthened, and prepared for its natural functions.

There is not necessarily organic disease of the genital system in all cases of menstrual disorders, though I believe the rule will prove some pathological condition of ovary, uterus or vagina. I have seen girls of healthy appearance, of good color and muscular development, enter school with a history of good health and regular function, who, after two or three months, would suffer from a amenorrhœa or dysmenorrhœa, without losing flesh or color or appetite, and without symptoms of disease of the

genital organs, as ordinarily manifested, but upon close study of their characters and dispositions, they would be found to be excitable, impressionable, and probably suffering from constipation. I have formed the conclusion that undue expenditure of nerve force, the mental tension, together with the want of fresh air, sunshine, and agreeable recreation, were the principal combined causes in these cases.

We can frequently trace amenorrhœa to an injudicious bathing of the feet in cold water, getting wet, or changing flannels too early; in truth, any of the menstrual disorders may be caused by these, and neglect of outdoor exercise and physical development, over brain work and excessive development of the nervous system, shock, improprieties in dress, imprudence during menstruation, insufficient sleep, habitual constipation. I speak principally of the condition and causes affecting girls while at school.

Many of them readily develop some of the neuroses, which are manifested in different ways, and are sometimes the only objective symptoms of an ovarian or uterine disease. They begin to fail, lose appetite, grow pale, distressed by headaches, spine aches, a sense of exhaustion and disordered functions. It is sometimes difficult to differentiate between a pathological state and a reflex neurosis.

The treatment of these disorders, under surrounding conditions, is no simple matter, as has been indicated above. The treatment ought, in fact, to begin at home, before the age of puberty, before the patient enters a boarding school, by instructing the mother in the necessary female hygiene for her daughter, in the care of diet and digestion, in suitable dress, in muscular development, and especially should she be trained to a sufficient moral restraint, that her own will power can be exercised so much to her advantage, and while teaching her how to care for self, and its importance during menstruation, yet lead her away from all other thoughts of the sexual system, keeping her a girl as long as possible; insist upon the great necessity of following well established rules during her absence from home, so that the changes may come and find a healthy, well developed physical

system, prepared to carry on the new function. It ought to be remembered that a large number of girls inherit a tendency and a predisposition to these functional disturbances, and uterine and ovarian disease, and this remembrance should be turned to good account by training and moulding the physical system into strength, symmetry and beauty; not a grace and beauty that is temporary and flitting, but one that is solid and permanent. It is our duty to take an active interest in the care of the physical life of girls from infancy, institute a reform in the present modes of rearing and educating them, and rescue them from the physical degeneration that we unhappily so often meet with. It is the greatest and highest duty of the family physician to institute this early hygiene of girlhood, and guide them into healthy and vigorous womanhood. There is no glamour in this part of his work, no flashing of the plumes of success in the gradual triumph of persevering and continuous effort, as with the fascinating results of the gynecologist's glittering and mutilating knife, but with vigilance, patience and perseverance, brilliant results will be obtained.

The boarding schools, with few exceptions, are not generally prepared to give such patients the care and attention the condition demands, nor can they make such preparation until parents are taught the necessity of it, and are willing to co-operate and accede to the requirements expedient for good health.

The best results are obtained from complete rest at this period, diminishing or cessation of the studies and study hours, absolute suspension of piano practice, most of the time spent in a recumbent position, in a quiet, well ventilated room, with the best of sanitary surroundings. This period of rest, at the critical time, is of prime importance. A good purgative, to thoroughly empty the bowels, a more delicate, nutritious diet, that digestion may not be labored. These measures should anticipate for a day, if possible, the expected flow; she should be warned against and protected from exposure to cold, from cold baths and injudicious change of clothing, kept away from emotional and nervous excitement. Nerve sedatives, with a proper degree of caution,

are important; of these the bromides take the highest rank. Valerinate of ammonia, cannabis indica, hyoscyamia, apiol, all have their places, and are important aids to tide over the period. The preparations of opium are too dangerous to tamper with. There is, at this time, a depraved or altered mental condition, which it is not well to pass unnoticed. She should be kept tranquil and soothed by a kind but firm hand. When the patient is feeble, diffusible stimulants are very valuable. Ammonia and camphor do good service. Alcoholic stimulants are sometimes necessary, especially in cases of menorrhagia, when considerable blood has been lost. The effects of massage, when the patient is kept at rest through her period, acts both as a sedative and tonic, and is of inestimable value, healthful control of the nervous influences, warm baths, mustard plasters, hot applications to the pelvis, feet, and counter irritation to the spine, plenty of sleep, and kept in a cheerful mood.

Between the periods she should be under constant surveillance and great care should be taken of her health. If the tongue is coated and digestion is bad, nothing can be done until this state of affairs is corrected; especially should the habit of chronic constipation be overcome. In malaria, quinine, iron, arsenic and mercury in suitable doses, at proper intervals, when the system has been prepared for them, are the remedies par excellence in most cases. Suitable clothing is of much importance; in winter woolen shirts, and especially drawers, should be insisted upon to protect the abdomen, pelvis and thighs; this garment is much neglected; the feet should be kept dry and warm. Too many studies should not be required, nor too much piano practice. She should not be allowed to sleep in an overcrowded, ill ventilated sleeping room, the heating of which is so often neglected—sometimes too hot and then too cold. Too much stress can not be laid upon the necessary out-of-door exercises, recreation and amusements. So also should too violent muscular exertion be condemned. Regular bathing and friction of the entire body in order to keep the skin in good function, and as a revulsive,

is a valuable daily luxury. She should, in fact, have the advantage of all hygienic measures that can be accorded her.

So intimately connected is the nervous system with the sexual organs of woman that a disturbance of one will make a powerful impression upon the other, but in the treatment of these cases we should be careful to avoid adopting extreme measures, endeavoring to distinguish between a central lesion and a reflex neurosis. The prominent symptoms of one system will sometimes mask those of the other. Drugs hold a subordinate position in the treatment of these troubles. The so-called emenegogues are comparatively infrequently prescribed in the present day. The hygiene, the general care of the girl's health, the attention to all the details in this regard, the building up and developing of her muscular system, the prevention of too much mental work, especially as regards its character; sufficient open air exercise, recreation, amusements interspersed with mental labor and other duties, a healthy moral restraint and favorable social surroundings, are all important points in the treatment of these menstrual disturbances, and should be insisted upon when at all practicable. Well selected tonics and alteratives sometimes with cod-liver oil are important aids. This is a subject to which too little heed is given, and our girls are sometimes greatly neglected. The prosperity and happiness of man and the welfare of the nation demands that the profession should take an active part in the rearing of the female child, and by instructing mothers in the hygienic care of their children, the proper methods of developing their bodies, prevent the functional troubles that lay the foundation for a life-long invalidism by establishing permanent diseases of the sexual apparatus. There would then be less use for the gynecologist with his 500 or 1000 laparotomies with the uteri or appendages on exhibition in his museum; there would be fewer weakly neurotic children with their hereditary predisposition to countless troubles peculiar to their sex, and menstruation might be what it was intended to be, a physiological process and not a pathological condition.

SOME CONCLUSIONS DRAWN FROM CLINICAL OBSERVATIONS IN THE STUDY OF CERVICAL ENDOMETRITIS.

T. J. BELL, M. D.,

TYLER.

Inflammation of the mucous membrane lining the cervical canal, or cervical endometritis, also called endocervicitis, is among the most frequent diseases among women. The fact that gynecologists of late years are aspiring to öophorectomies, and hysterectomies, and laparotomies, and all the otomies and ectomies upon which modern theorists elaborate with apparent relish, has for the time covered up or hidden from view the more common and simple maladies with which so many poor women suffer. But, however much may have been said or written upon the grand achievements of modern gynecologists, and the successes that have attended their operations, and however much of gladness and praise has been sounded by suffering mortals who have been relieved and cured by these skillful operators—tempting others to enter the field for fame—not one of them has achieved more nor relieved his patient more than when he cured a chronic endocervicitis.

The symptoms of cervical endometritis are so familiar to every one, I suppose it is hardly necessary for me to take up valuable time in dwelling upon this. Suffice it to say a woman who has suffered for years with this affection, until she is literally worn out, nervous, with headaches, backache, and all sorts of aches and pains, is of all men or women most miserable.

Among the most frequent causes of endocervicitis there stands laceration of the cervix, corporeal endometritis and intemperate coition. I doubt very much if taking cold or standing on damp

ground, getting feet wet, etc., has anything to do with causing an inflammation of this particular part of this particular organ, unless it is when the organ is in a state of hyperæmia, if you please—at menstrual period or immediately after cohabitation.

Lacerations of the cervix to a greater or less degree are of very frequent occurrence in child-bearing women, and may be a very fruitful source of this trouble, though this is denied by some.

Corporeal endometritis, arising from whatever cause, and especially from imperfect cleansing of the uterine cavity after labor—either mature or premature—will sooner or later, by its acrid discharges being poured out through the cervical canal, if for no other reason, involve the cervical lining. But of all the causes of this distressing trouble, I believe not enough importance has been given to intemperate coition. To say nothing of this very common cause among prostitutes, it is of no infrequent occurrence among the better class of women.

The hyperæmia taking place in the generative organs of the female during the act of copulation is certainly sufficient, if this act is repeated at short intervals for a great length of time, to after awhile leave a lasting impression upon the more delicate tissues involved. The cervical mucous membrane being covered with a very delicate epithelium, and at the same time being exposed to very rough treatment frequently, it is no wonder if it does often become inflamed.

The impression that a woman with endocervicitis will not become impregnated, is false. Many cases do become pregnant; in fact, I hardly believe that a moderately severe chronic inflammation of the cervical mucous membrane is any obstacle to impregnation.

I will mention two or three cases to illustrate my position:

CASE I.—Mrs. B., mother of one child about eighteen months old, sent for me and gave history of having suffered for many months with all the symptoms of cervical endometritis—had lost flesh and was badly run down. She said her menses had been irregular for a year or more, frequently missing a month or two; this time had missed about three months, but did not believe she was pregnant. Upon examination I found a copious muco-purulent discharge covering not

only the external but the entire visible portion of the cerox. The cervix was very much enlarged, with very extensive erosions. I really thought it impossible for impregnation to have taken place with the cerox in such condition as I found this one, and stated to her that the probabilities were that she was not pregnant, but in cleansing the canal and making some applications, I suppose I must have passed my instrument beyond the dead line and caused an abortion. Evidently from her complaint this woman had suffered with cervical inflammation long before she conceived.

CASE II.—I was called last July to Mrs. W. for persistent nausea and vomiting, which she thought indicated pregnancy. After giving her all sorts of stomachics, tonics, sedatives and anodynes to no avail, I got her consent to make examination with speculum, and found cervix very much as in Case I; if any difference, more inflammation and more erosions in this case than in Case I. I cleansed the part, including the canal, and applied tinct. iodine and carbolic acid, equal parts, every second day, and soon had the satisfaction of seeing an improvement, and in March I delivered her of a nice baby. This woman gave a history of some womb trouble since the birth of her first child, five or six years before, and indeed a marked bilateral laceration was dated back to her first delivery, proving conclusively, I think, that she must have had an endocervicitis for a long time, notwithstanding she has followed the usual custom of having a baby after every evolution of the maternal generative organism.

CASE III.—Mrs. E., a prima para, gave the following history: A year or more before I was called she had a fright after having missed her menses only a week or so, and fainted and fell while out in her flower yard, and after being put to bed it was discovered that she was having a rather profuse uterine hemorrhage, which was thought at the time to be only a return of the menstrual flow. She was given constitutional treatment only, as she stated, and after many months of suffering, and being bed-ridden for a greater part of that time, she was finally curetted and treated otherwise locally as well as constitutionally, and was very much improved and thought she was getting well, and evidently had conceived again—I say again, because I believe the origin of her trouble was an early abortion—for I found her with a persistent uterine hemorrhage, very much emaciated, run down and nervous, and finally convinced her of her conception and abortion by curetting the uterus, taking away a rather large quantity of the decidual membranes and placental tissue, after which I treated with an occasional curetting, antiseptic douches and applications of iodine and carbolic acid, together with iron, strychnine and other restoratives constitutionally. Under this treatment she rapidly improved, but be-

fore I had succeeded in perfecting a cure of the cervical inflammation, human nature asserted itself, usurped authority, and overstepping my interdiction, she became pregnant at the very first and only opportunity, as they declare, and is now under rigid surveilance and the tenderest care to prevent another abortion. The cervical inflammation in this case was not so great nor so extensive as in the two former cases, but I am positive that she had an endocervicitis when she conceived the last time, and rather think she had when she became pregnant the second time.

These three cases are sufficient, I think—though I could cite many more—to demonstrate the fact that chronic endocervicitis is not a bar to impregnation.

In this day of microbes and bacteriological investigations, a paper upon a subject of so much importance to the practitioner would probably be considered incomplete without some consideration of the bacteriological aspect of this disease.

Standard works on gynecology are not replete with suggestions upon this, as some think, important feature in this very common disease, but Munde and Rau, in writing upon corporeal endometritis in *Sajous Annual* of 1893, state that Brandt has found in that disease as many as fourteen different species of micro-organisms; and one may readily conclude from his further remarks that he is undecided as to whether any one of these species is responsible for the pathogeny of that disease, inasmuch as pathogenic and non-pathogenic, as well as pyogenic micro-organisms have all been in the secretions of non-inflamed vaginal and cervical mucous membrane.

I am of opinion that in the cervical canal, whether in a state of health or disease, may be frequently found both pathogenic and non-pathogenic germs; therefore we may conclude that cervical catarrh is not necessarily a disease of microbic origin.

One of the greatest troubles we may experience in treating and curing these cases lies in the difficulty of getting the full consent and perfect co-operation of the patient. No amount of argument sometimes will convince our patient that she should not be cured in a very short time, whereas those who have had much experience with the disease know it will not be wise to

place any limit whatever on the time likely to be required to effect a cure. My experience in treating this trouble teaches me that the better plan is to tell my patient: "I khow I can cure you if you will give me time and your co-operation. It may take a few months or it may require many months."

Many plans of treatment have been suggested from time to time; some advocating the use of the currette—some the dull currette and others the sharp.

The old doctrine of "ulceration" caused many a poor woman to have to undergo the tortures of applications of lunar caustic, and what was worse than the application itself, it not only generally did not only cure, but made matters worse in the future. The most successful plan or treatment in my hands has been curetting, when necessary, with dull curette—I am of opinion that the sharp curette should be very seldom, if ever, used in the cervical canal—followed with perfect cleansing with sterilized water as hot as can be well borne; dry the part thoroughly, and apply by means of gloss pipette tinct. iodine and carbolic acid, equal parts, being careful to touch every part of inflamed membrane with the lotion. When the mucous membrane has become indurated from long continued inflammation, I have found iodoform a most excellent application—it may be applied dry or in the form of an ointment.

Constitutional treatment should never be left out of the question. If the woman is anæmic, as many of them are, give her strychnine and iron, and it may be well to combine with this some of those drugs which are said to exert a specific influence upon the uterus; especially is this well in those cases of long standing, where sub-involution has existed and there is induration or hardening of the cervix. Of this class of drugs I have had good effects from the preparations of hydrastis, and if a tendency to metrorrhagia exists, combine with this Fld. Ext. Ergot and Fld. Ext. Viburnum Prunifolium.

It is generally a matter of great importance to interdict coition, or any kind of exercise that would be calculated to irritate or increase the flow of blood to the part. But the most import-

ant of all is to encourage the patient to co-operate in whatever plan of treatment is adopted until a cure is effected. If there has been an extensive laceration, the case should never be pronounced cured until this has been repaired, as a restoration of the normal circulation in the cervix is imperatively necessary to a perfect success.

My object in writing this paper was to not only direct attention to the frequency of this disease, but elicit discussion upon two points particularly, *i. e.*, that intemperate coition is one of the most frequent causes, and that catarrhal inflammation of the cervical mucosa is in many instances not a bar to impregnation.

LEUCORRHŒA—ITS CAUSES, VARIETIES AND TREATMENT.

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The subject of the present communication, trite as it may seem, is well deserving of fuller consideration than is generally accorded to it by modern gynecological authorities. In a large proportion of instances the first symptom that directs the attention of patients to the most common forms of disease peculiar to women is leucorrhœa, or, in other words, some abnormal mucoid exudation from the genital canal. Such discharges, although obviously symptomatic, are frequently so prominent a feature of these cases, or are so obscure in their causation, so far-reaching in their consequences, or so intractable in their management, as to occasion no small a part of the diagnostic and therapeutic difficulties encountered in this special branch of practice.

It may, therefore, be not altogether useless to review briefly, from the standpoint of a somewhat extended clinical experience, our knowledge of the general pathology of leucorrhœa, the circumstances from which this originates, the results it occasionally produces, and the methods available for its treatment.

Under the term leucorrhœa I shall here include all those mucoid exudations containing elements foreign to healthy mucus that may proceed from the lining membrane of any portion of the female genital tract. These discharges are commonly classified in accordance either with their special cause, or from their

primary location. The latter arrangement, although open to the objection that this complaint seldom remains permanently confined to its starting point, and also that its characteristics, consequences and treatment are influenced, not alone by its situation, but, moreover, by the special exciting cause of the discharge, and by the constitutional condition of the patient in each instance, is nevertheless probably as good as any other that can be suggested, and hence will be followed in the subsequent observations, in the course of which the vulvar, vaginal, uterine and tubal forms of leucorrhœa must be separately discussed.

Before so doing, however, I may premise that mere blenorrhœa, or simple hypersecretion of the mucus—containing no morphological elements besides detached epithelial cells and mucous corpuscles—normally secreted by the genital lining membrane, does not come within the purview of my remarks on leucorrhœa, although it is so included by other writers. Irrespectively of any pathological conditions that natural secretion of mucus may physiologically be increased by local hyperæmia consequent on ovulation or pregnancy. Moreover, its normal amount bears a constant relation to other circumstances, being greatest during the epochs of reproductive activity and in married life; and, on the other hand, being smallest in quantity before the period of puberty, and again in advanced age when the vaginal rugæ become comparatively bloodless or obliterated, and when, also, the uterus and its adnexa generally undergo a more or less marked process of senile atrophy.

I. VULVAR LEUCORRHŒA.

In reference to leucorrhœal discharges from the labia, nymphæ, and adjoining parts within the vulvar area or in immediate vicinity, it may be observed that not only are these mucous surfaces peculiarly exposed to the external or catarrhal, infective, and traumatic causes of local inflammation resulting in exudations, but also in the contiguous glandular structures present a fertile field for their development and extension. For instance, the vulvo-vaginal or Bartholinian glands in the deep fascia on either

side of the vaginal orifice are, together with their afferent ducts opening at the side of the nymphæ, liable to inflammation, often resulting in abscess or in cystic disease, one of the first symptoms of which is an excessive and vitiated mucoid exudation.

The most common causes of vulvar leucorrhœa are, with one exception, especially exemplified in pediatric practice. Thus, in the Children's Hospital, Dublin, with which I have been connected for the past twenty-three years, I have had occasion, as I pointed out in some lectures published in 1886, and again in my recent "Handbook of Diseases of Women," to notice the great frequency and importance of leucorrhœa in children of all ages from infancy up to puberty. Moreover, such discharges may possibly become of medico-legal as well as therapeutic interest, as I have seen in several instances where I have been called on to give medical evidence in reference to charges arising from this occurrence.

As, however, the practical importance of vulvar leucorrhœa in childhood does not appear to be sufficiently recognized, I would commend the following remarks of Dr. Keating, of Philadelphia, to the careful consideration of those who have to deal with such cases: "The catarrhs of infancy, which may result from cold, pent up secretions, want of cleanliness, etc., act on the mucous lining of the uterus, as they do on that of the nasal passage, producing congestion, infiltration, and finally stenosis of the passages. The effect this has upon the uterus is to congest it, to obstruct its canal, and to increase its weight, and undoubtedly not a few of the uterine flexions and versions, with their many symptoms, including dysmenorrhœa, that attend puberty, or follow it, owe their origin to this cause. * * * Every mother should be taught that no child should have protracted leucorrhœa—that it is a pathological condition, and needs the immediate attention of the physician."*

Nor are the effects of neglected vulvar leucorrhœa limited to those above mentioned, for, as another American authority, Dr.

* Leucorrhœa. Cyclopædia of Diseases of Children. Edited by John M. Keating, M. D. Vol. III., p. 716. Philadelphia, 1890.

Currier, has pointed out, although either vulvitis or vaginitis may exist alone, more frequently the infectious disease which begins with the vulva does not end there, but may extend to the uterus, the Fallopian tubes, the ovaries, and the peritoneum, and therefore, as he adds, it seems extremely probable that many of the deformed and undeveloped uteri, with which are associated so much dysmenorrhœa and anguish, sterility and domestic unhappiness, are the legitimate consequences of vulvo-vaginitis in early life.

ETIOLOGY—Of all the causes of vulvar leucorrhœa one of the most important in childhood is a constitutional strumous taint, the local influence of which is often as obvious in this complaint as in the chronic glandular affections of children of that diathesis. Next in frequency is the causation of such discharges at all ages, but more especially in the ill-cared children of the poor who have come before me in the extern departments of the hospitals to which I have been attached, is the too common neglect of that attention to the cleanliness of the genitalia which is essential to their sanitary integrity. In other instances, vulvar leucorrhœa is consequent on local irritation traceable to ascarides. Still more frequently, in young and old alike, it presents a catarrhal form following exposure to cold or wet, or it may result from direct injury to the parts as well as from any other cause of vulvar inflammation, whether non infective or specific—*i. e.*, gonorrhœal or syphilitic.

SYMPTOMS—Reserving the last mentioned or specific forms of leucorrhœa for subsequent consideration, the ordinary symptoms of pudendal inflammation, leading to mucoid discharges from the vulva, are briefly: A sense of fullness, or discomfort in the external genitalia, together with a hyperæmic tumefaction of the vulvar mucous membrane, followed by the exudation of a discharge, which from the first is generally much more viscid and tenacious than in the vaginal forms of the complaint. In many instances the pudental orifice is so glued together by this discharge as to cause considerable pain and difficulty in micturition.

TREATMENT—A primary point to be attended to throughout the treatment of vulvar leucorrhœa is to secure, as far as possible, the asepsis of the affected surface by the frequent use of warm antiseptic lotions—such as boric acid, 1 in 25; izal, 1 in 100; lysol, 1 in 100, or corrosive sublimate, 1 in 2000—so as to sterilize and to cleanse the parts as thoroughly as practicable from the abnormal exudations, which, when allowed to accumulate there, are liable to become decomposed, and thus not only increase the local irritant, but also furnish a medium for the reception and development of pathogenic micro-organisms, by which the entire genital tract may be speedily infected.

Without entering in detail on so wide a question as the causes, immediate or predisposing, of the hyperæmic and other conditions of the vulva that may give rise to leucorrhœal discharges therefrom, and the recognition and treatment of which is essential to their cure, it will, perhaps, suffice to say that, in ordinary cases of catarrhal and simple inflammatory mucoid discharges from the lower segment of the genital tract, these exudations may, generally speaking, be arrested either by the application to the vulvar mucous surface, by the insufflator, of non-irritating, dry antiseptic, astringent agents—such as loretin and salol—or by the topical employment of boro-glycerine, and glycerine of carbolic acid; or, and oftentimes no less effectually, by some of the older-fashioned ordinary local astringents, such as a strong (*i. e.*, ʒii. to ℥i.) solution of nitrate of silver. In the interval between these applications the parts should be kept well separated by creolin gauze (ten per cent), saturated with dilute liquor plumbi, or hazeline, until the discharge has completely subsided. During this local treatment the patient, if we wish to effect a speedy and permanent cure of acute vulvar leucorrhœa, should be restricted to bed, and, after free purgation, be put on a light, nutritious dietary. Even in the chronic forms of this complaint these measures are frequently no less advisable, in conjunction with the addition of any tonic or other remedy that may be specially indicated by the existence of strumous, chlorotic, anæmic, or other constitutional cachexiæ, one or other of

which are so generally associated with chronic vulvar leucorrhœal discharges, and by which, in not a few instances, they may be produced or kept up.

II. VAGINAL LEUCORRHŒA.

Whilst as already observed leucorrhœa, if neglected, sooner or later travels far beyond its primary seat, nevertheless, in many instances this process of invasion is indefinitely protracted and for a time at least the complaint remains localized, and evinces distinctive features consequent on the structural and physiological characteristics of its starting point. Thus, for instance, leucorrhœal discharges from the mucous membrane of the lower portions of the vagina are generally less viscid than those proceeding either from the vulva or from the upper part of that canal, or still more, those from the cervix. From the latter vaginal mucoid exudations further differ, not only in their acid reaction, but also in that peculiar opalescent yellowish-white, creamy color to which the disease owes its popular name —"the whites." This distinctive appearance is obviously due as much to the larger proportion of albuminous constituents, both in solution and in suspended flocculi of coagulated albumin, which such vaginal secretions contain, as to the presence therein (as was originally demonstrated by the late Dr. Tyler Smith, to whose exhaustive and too seldom acknowledged researches on this subject subsequent writers owe much) of innumerable scaly epithelial cells, and fatty debris with which, as the disease progresses, genuine pus corpuscles and blood discs may eventually be interspersed.

On the other hand, those yet more opaque, semi-solid, curdy exudations, frequently observable in the upper portion of the vagina, generally result from the admixture there of its acid secretions with akaline cervical discharges, and the consequent firm coagulation and ultimate local adhesion of their albuminous constituents. In this way the vaginal walls may become so densely encrusted by pseudo membranous looking exudations as to produce those appearances which some authorities have, as

I think, erroneously, ascribed to croupous or diphtheritic vaginal disease.

ETIOLOGY OF VAGINAL LEUCORRHŒA—The causes of this condition include all the forms of local irritation to which the genital canal is liable, such as the following: (1) catarrhal and (2) strumous inflammation of the vagina, (3) follicular vaginitis, (4) specific, and more especially gonorrhœal infection, (5) neglect of cleanliness, (6) irritation from worms, (7) vaginal tumors, (8) congestion resulting from uterine displacements, (9) mechanical injuries, (10) over-stimulation of the parts, as frequently evinced in newly married patients. Vaginal leucorrhœa may also arise, (11) from the extension of uterine, tubal, ovarian or pelvic disease; or (12) from the genital hyperæmia attending the latter months of pregnancy; or (13) from the topical congestion ushering in the catamenial epochs, or consequent on the menopause. Moreover, independently of any local lesion leucorrhœal discharges may (14) be vicarious of menstruation; or (15) be consequent on arrested lactation; or (16) be due to metastasis of remote disorders; and lastly (17), they may be the result of constitutional debility, however occasioned, giving rise to impaired tonicity of vaginal mucous surface, and consequent hypersecretion therefrom.

III. VAGINAL LEUCORRHŒA FROM INFLAMMATORY LESIONS.

Although the causes of leucorrhœa are so many-sided, as is indicated in the foregoing list—which might be extended—it will suffice here to refer chiefly to the more important of the inflammatory or sub-inflammatory conditions that commonly give rise to that discharge. Among these are: (1) Catarrhal and simple local inflammation; (2) infective or gonorrhœal; (3) strumous; and (4) follicular vulvitis. In not a few instances, however, it will be found practically impossible to distinguish between the former—all of which, if unchecked, may eventuate in the last-named or follicular type of the disease.

SYMPTOMS—Vaginal leucorrhœa, from any of these inflammatory lesions, is generally preceded by a sense of heat and irri-

tation in the affected mucous surface, which at the same time is tumefied and dry, until this hyperæmia becomes relieved by more or less profuse leucorrhœal exudations from the inflamed membrane. On local examination the caliber of the canal will now be found diminished, owing to congestive tumefaction of its walls, and the vaginal mucous membrane highly vascular in aspect, when freed from the tenacious and possibly muco-purulent discharge by which it is coated, and by which is overlaid the mucous follicles (ultimately eroded, hypertrophied, and dotted over with clusters of proliferating mucous papillæ). This condition, which may endure for an indefinitely protracted period, is very generally present in cases of long-standing vaginal leucorrhœa, and is then commonly connected, whether as cause or effect, with some form or other of chronic uterine, peri-uterine, tubal or ovarian complaint.

DIAGNOSIS—The differentiation of gonorrhœal from non-specific inflammatory exudations from the vaginal mucous membrane, is a matter of great importance, and often of much difficulty. In both instances the extending local inflammation may give rise to discharges from the mucosa of the urethra and bladder, as well as from the vulva-vaginal surface, which can only be distinguished by the recognition of the gonococci of Neisser in the former class of cases. Frequently, however, this test is not practically available; nor is it always reliable, as that gonococcus is not invariably discoverable with certainty, at least by immediate microscopic examination, in gonorrhœal discharges, whilst, as Parrish and Baldy have pointed out, occasionally other micro-organisms, apparently morphologically identical with gonococci, are found, which can be distinguished only by an expert. Moreover, as they add, "the disciples of Neisser have by no means satisfactorily proven that the gonococcus is the cause of gonorrhœa." Under these circumstances, as a rule, our diagnosis must be grounded on the probabilities and history rather than on the immediate pathological evidences, or on the symptoms of the complaint. It should hardly be necessary, therefore, in this connection, to observe that in cases such

as these, in which a patient's reputation or domestic happiness may be involved in the question now referred to, our opinions cannot be too carefully considered or too cautiously expressed.

COMPLICATIONS—Vaginal leucorrhœa, whatever its origin, as before said, invariably tends to extension to the contiguous mucosa, and hence urethritis, vulvitis, and cervicitis—often resulting in dysmenorrhœa and sterility—are daily observed in cases of this kind. Moreover, the specifically infective forms of vaginal exudation, if neglected, frequently lead either to endouterine disease or to graver tubal complications, such as salpingitis and pyo-salpinx; or may eventuate in pelvic cellulitis and other inflammatory lesions of the pelvic connective and serous tissues.

TREATMENT—In whichever of the above described forms leucorrhœal discharges from the vaginal walls present themselves, the principles on which they should be treated are essentially similar and in none of them can the *minima diligentia medicina* be safely acted on. In most instances the obvious therapeutic indication is the abatement of that local hyperæmia on which the exudation is consequent, and this can only be accomplished by the removal of its immediate exciting cause, and by the cleansing away as far as possible, and, if necessary, the sterilization of the discharge. With these objects, should the origin of the complaint be gonorrhœal or other specific infection, effective germicidal agents such as 1 in 2,000 solution of bichloride of mercury, or creolin (1 in 200) should be freely locally applied; whilst in the majority of other cases of vaginal leucorrhœa of catarrhal and inflammatory causation, all that need be locally employed in the initial stage of the complaint is the frequent and abundant use of hot water followed by weak lead lotion, dilute solution of fluid extract of hydrastis canadensis or any other soothing vaginal irrigation.

As soon, however, as the acute inflammatory condition of the vaginal mucous membrane commonly connected with the commencement of leucorrhœa has subsided, or where it does not exist, and when the exudation has become well established, the

local employment of ichthyol in the form of a ten per cent ointment may prove remarkably effectual, as I found in several instances, in arresting vaginal discharges, and removing the chronic inflammatory conditions with which they may be connected. This remedy is, however, so malodorous and messy in its use, as to prevent its general adoption. The ordinary necessary local astringent and antiseptic applications, such as boric acid and salol, may more commonly, therefore, be best employed in the way of the so-called "dry treatment" with the aid of the vaginal insufflator, by which I generally direct a powder consisting of equal parts of boric acid and alum, or iron alum, to be introduced in the vagina daily until the discharge becomes checked. More recently, I have similarly employed, though in smaller quantities, vaginal insufflations of loretin—a comparatively new dusting application which Messrs. Burroughs and Welcome brought under my notice last year, and which I have since then tested in several cases in my hospital. So far as I have been thus enabled to form an opinion, this agent, which apparently possesses many of the surgical uses of iodoform, whilst devoid of its offensive odor and toxic properties, would seem especially serviceable in the local treatment of muco-purulent and fœtid leucorrhœal vaginal discharges. Before the employment of any of these insufflations, the vagina should on each occasion be well flushed out with carbolized or other antiseptic injection (temp. 110°).

In a few otherwise intractable cases of chronic vaginal leucorrhœa, I have experienced special benefit from the local use of a mixture of one part of glycerine of carbolic acid with four of glycerine of tannin, applied by means of a saturated tampon introduced through the speculum, on the removal of which the tampon should be retained for some time so as to bring the contracting vaginal walls in contact with the expressed astringent. In one instance my assistant, by accident, saturated the cotton wool with pure carbolic acid, nor was this discovered until the vaginal surface was observed to become whitened and shrivelled up. The vaginal surface was then washed out with an alkaline

injection, and the patient remained unconscious of the mistake that had occurred. Some days subsequently a complete cast of the vaginal mucous membrane was thrown off, the result being a permanent cure of the pre-existing vaginitis, and consequent leucorrhœa. This method of treatment, I need hardly say, however, is not here mentioned as one to be generally adopted in such instances, in few, if any, of which will any other local remedies than those above recommended be found necessary.

VAGINAL LEUCORRHŒA OF PREGNANCY.—The physiological hyperæmia of the genital tract consequent on utero-gestation, commonly gives rise to hypersecretion of vaginal mucus. This being a symptom rather than a disease of pregnancy, generally calls for nothing more than proper attention to local cleanliness by the free use of warm water and coal tar or carbolic soap, or possibly the occasional employment of vaginal insufflations with boric acid. In some instances, however, the exudation is of thicker consistence, creamy, or yellowish in color, and distinctly muco-purulent, giving rise to intense pruitus of the pudendum, especially in the latter months of pregnancy. This discharge may be confounded with that resulting from gonorrhœal infection from which it must be differentiated as before described. Moreover, as Dr. Leishman observed when simply due to pregnancy, even the most profuse discharges rapidly disappear after delivery; and seldom attract any notice after the lochia has ceased to flow. Cases, however, occasionally occur in which such a discharge, originally appearing during pregnancy, lasts during the convalescence after labor, and ends in an obstinate and troublesome vaginal leucorrhœa. The treatment of this affection must necessarily be confined within certain limits, so that sometimes palliation is the most we can hope for. Cauterants, or strong injections, can not be employed, lest they should induce premature labor, and even the simplest injections must, if used, be employed with the greatest possible caution, as it is well known that repeated injections, even of tepid water, will often suffice to induce uterine contractions.*

Vide Leishman, "System of Midwifery," vol. I, p. 269.

In cases of this kind I have myself almost always found constitutional treatment, and more especially the exhibition of iron and quinine or other tonics, no less necessary and serviceable than that mere attention to vulvo-vaginal cleanliness, which, together with astringent lotions and suppositories, are more commonly relied on.

Leucorrhœal discharges in the last months of pregnancy are especially prone to occasion great irritation or even erosion of the external genitalia, and for the relief of such cases of pruritus, in addition to the ordinarily employed local sedatives, I would again strongly recommend a fair trial of the methyline blue solution, which I recently suggested,* as one of the best of all topical analgesics in pruritic affections of the pudendum generally.

IV. VAGINAL LEUCORRHŒA OF CONSTITUTIONAL CAUSATION.

Apart from any of the before mentioned direct local sources of local irritation or hyperæmia, the secretions of the vaginal and uterine mucous surfaces may be abnormally augmented and altered by various constitutional causes, as is observed in patients of well-marked strumous diathesis, in whom abundant glairy exudations from the genital mucosa are hardly less common than the similar looking catarrhal discharges from the naso-pharyngeal surfaces and glands of scrofulous subjects. In like manner the importance of a constitutional factor in leucorrhœal cases is also apparent in females suffering from chlorosis, anæmia and other forms of debility, and in whom blenorrhagic vaginal hypersecretions that can not be traced to any local lesion, and evidently consequent on general impairment of vascular tonicity, are so often noticed. In other instances, again, the constitutional cause of leucorrhœa is proven by its occurrence as a direct consequence of arrested lactation, or as a metastasis of gouty or rheumatic disorders. Still more obvious in this connection is the so-called amenorrhœal form of leucor-

Vide British Medical Journal, January 19th, 1895.

rhœa, in which we find the suppression of menstruation attended by more or less non-hæmorrhagic discharges from the vagina and endo-metrium.

VI. CERVICAL LEUCORRHŒA.

Of the many factors concerned in the etiology of leucorrhœa, none are of greater importance or more frequent occurrence than the various lesions, catarrhal, inflammatory, traumatic, hyperplastic, infective and malignant, by any of which, as well as by constitutional conditions, the glandular structures or mucous surfaces of the cervix uteri may be so implicated as to give rise to morbid exudations therefrom. It being impossible, however, within my present limits to refer in detail to all these different causes of cervical leucorrhœa, I must here confine myself to some observations on the general characteristics and treatment of the non-specific discharges most commonly thus occasioned.

GENERAL ETIOLOGY OF CERVICAL LEUCORRHŒA.—These exudations consist primarily of a hypersecretion of the bland crystaline mucus which is normally evolved from the muciparous follicles and epithelial surfaces of the rugous portion of the cervical canal. This, under pathological conditions, becomes gradually altered in character as well as in quantity, and eventuates in that viscid glutinous or bird-lime like discharge, frequently acrid in alkalinity, which may be seen coating the gaping lips of a lacerated cervix in instances of chronic ciccatrical ectropium, or extruding from the os uteri in cases of endo-cervicitis. If traced further up, that exudation will then be found, as was clearly described by Tyler Smith, adhering closely to the cervical crypts and rugæ, so as to fill the canal, and consisting chiefly of mucous corpuscles, oil globules, dentated epithelial cells, with which are also not infrequently found blood discs and pus corpuscles, enveloped in a thick transparent plasma, closely resembling raw white of egg, remarkable for its tenacity, alkaline in its reaction, and thus contrasting distinctly with the thin acid secretions of the vaginal mucous membrane.

SOURCES OF CERVICAL LEUCORRHŒA.—These exudations may originate either from the sinous fossæ lined with cylindrical epithelium, between the plicæ palmata on the anterior and posterior walls of the cervix, which may be regarded as the secretory organs of the normal viscid, crystalline mucus of the cervical canal, or from the so-called ovula Nabothi in the same region. The latter vesicles, composed of connective tissue and cylindrical epithelium, may, perhaps, like the Graafian follicles, be regarded as closed glandular vesicles, bursting periodically, though possibly, as Kolliker observed, they "are nothing more than dilated and closed mucous follicles, and in part also pathological new formations." Be this as it may, however, the muciparous follicles, closed and open, which are normally the sources of the healthy cervical mucus, undergo a periodical enlargement and increase of secretory activity in connection with ovulation, and more especially manifest during pregnacny, when they secrete that mucous plug by which the cervical canal is then closed.

CONSEQUENCE OF CERVICAL LEUCORRHŒA.—Under normal conditions the crystaline cervical mucus not merely acts as the natural lubricant of the canal, but, moreover, serves, in the interval of the catamenia, as a block by which the entrance to the uterine cavity is guarded against the admission of pathogenic germs, and also as a suitable medium for the passage of spermatozoa in the uterus, as well as a seal to its orifice during pregnancy. All these functions are impaired or destroyed when that secretion becomes abnormal or leucorrhœal, a condition which even in its most simple form must not only constitute a more or less serious constitutional drain, occasioning impairment of the patient's general condition, but also prove a likely focus of infective disease from the possibility of septic changes in the vitiated and adherent discharges. Moreover, these exudations, especially when their morphological elements, their viscidity and alkalinity are most distinctly abnormal, are of direct pathological moment as frequent sources of irritation and erosion of the cervix, and, above all, are of special interest in reference to

the causation of sterility. The latter point is one of great practical and often neglected importance in connection with the treatment of barrenness. In such cases it very frequently happens that operative measures to overcome supposed stenosis might be dispensed with if the circumstances, first clearly pointed out by Marion Sims, that probably the most common cause of sterility is an abnormal condition of the cervical secretions, was sufficiently recognized. That effect may be produced, either mechanically, by the calibre of the canal being so completely filled by the unduly viscid mucus as to interpose an insuperable barrier to conception, or chemically, by its being so hyper-alkaline and acrid as to occasion the immediate destruction of the spermatozoa. This fact has been abundantly confirmed by my own clinical experience of numerous cases in which the cure of sterility was effected by the thorough curetting of the cervical canal, so as to destroy the diseased secretory surface, as well as to clear the passage from the mechanical obstacles presented by its morbid exudations.

TREATMENT.—In reference to the general pathology and therapeutics of the conditions leading to cervical leucorrhœa, I may observe that, in the old "Dublin Obstetrical Transactions," upwards of twenty years ago, I pointed out their common connection with constitutional, and more especially with strumous, diseases, and urged the consequent importance of conjoining constitutional treatment with whatever local measures might be necessary in such cases. In a more recent work* I again endeavored to enforce this still neglected truth, in which, however, I have since discovered that I had been anticipated by the late Dr. Tyler Smith, to some of whose views on the etiology of leucorrhœa I have already referred. As Dr. Tyler Smith was one of the first and ablest exponents of the importance of constitutional treatment in leucorrhœal cases, and as his papers in the Lancet on leucorrhœa, though republished in his work on that subject five years subsequently, are probably not familiar to

*Vide "Clinical Gynecology: a Handbook of Diseases Peculiar to Women," by T. Moore Madden, p. 148. London and Philadelphia, 1894.

many at the present day, his remarks on this point may be here very briefly summarized. The glandular structures of the parts, he says, whence the discharge arises, points to the influence of constitutional causes, and exemplifies why this affection should be so common to women of strumous habit and leuco-phlegmatic temperament. Moreover, it vindicates the importance of constitutional treatment, and directs attention to the more rational employment of topical remedies, it being evident that, although leucorrhœa of the cervical canal is sometimes cured by the use of caustics to the os uteri, in these cases they act as counter-irritants to the glandular structure. The indications of treatment, based on a knowledge of the minute anatomy of the os and cervix uteri, and the study of its pathology in leucorrhœa, show the importance of combining constitutional medicines and regimen with local applications, which, to be of any use in cervical leucorrhœa, should be applied, not to the vagina, nor to the os uteri, but to the canal of the cervix.*

The latter object may, I think, be most readily and effectively carried out by the employment of the curette, and for this purpose I have found Duke's dull-wire cervical curette most useful in the thorough removal of that viscid, tenacious discharge by which the canal is blocked in cases of cervical leucorrhœa without any risk of too deep a denudation of the walls of the passage. Before employing this or any other curette, however, I generally find it advisable to dilate the canal freely by the two-bladed dilator which I have shown here on previous occasions; and, in my practice, immediately after curettage, the denuded endo-cervical surface is brushed over with iodized phenol, the patency of the passage being subsequently maintained by the use of salol bougies.

Such local measures should, generally speaking, as before observed, be conjoined with constitutional treatment, and more especially those remedies specially indicated by the strumous diathesis so frequently noticeable in patients suffering from chronic leucorrhœal discharges. Without again enlarging on

Vide Tyler Smith on Leucorrhœa, Lancet, July 7th, 1852.

this point, it may be enough here to say that in the way of general treatment, in the majority of these cases, the physician must rely chiefly on those ferruginous—such as iodide, phosphite, or hypo-phosphite of iron—which, with mineral acids, quinine, cod-liver oil, and maltine, or malt preparations, are—in conjunction with the suitable hygienic and dietetic measures—his ordinary resources in all strumous disorders. The only drug which would appear to me to have anything like a special or even a commonly remedial effect in ordinary chronic leucorrhœal cases is arsenic and its combinations, such as Donovan's solution, from which, when administered in small and long-continued doses, I have unquestionably experienced much benefit in the treatment of many cases of this kind.

The extent to which this paper has reached precludes my trespassing further on your patience by now reading the observations I had prepared on the endo-corporeal, fundal and tubal forms of leucorrhœa on which I have not yet touched. These remarks I may, in conclusion, however, venture to express a hope of being perhaps permitted on some future occasion to submit to the Academy.

REPORT OF A CASE OF HÆMATOCELE.

S. B. KIRKPATRICK, M. D.,

COMMERCE.

A hæmatocele is the presence of blood in an unusual position, and the cause or source of the hemorrhage is often beyond our knowledge. The symptoms are those of concealed hemorrhage; the patient becomes bleached, faint and collapsed.

Mrs. R., age thirty years, mother of six children, three living, the youngest twenty months old and still being nursed at the breast, was taken suddenly ill while on a visit to a neighbor June 5, 1894. She almost fainted, had pains in the pelvic region, with considerable tenesmus from what she thought was the uterus. A physician was called, who gave some temporary relief. I was not called until June 12th, just one week from the onset of the attack. I found her with a temperature of 100° F., bearing down pain in the pelvic region, with bulging above pubis mostly to the right; frequent desire to urinate, which she was unable to do; bladder pressed to the left, as noted by passing the catheter; os pressed low down, with a hot, bulging mass behind, which at the time I took for a retroflexed subinvoluted uterus; examination next day, with speculum and sound, found the uterus in its normal position, except slight enlargement and pressed low down. The bulging behind the os I then took to be an abscess, but after using aspirator and finding nothing, I was for a time at a loss to know what I had to deal with, but that I had some foreign substance, I could not doubt. At the time I did not think of a hæmatocele, besides I could have hardly believed it possible for blood to be in such hard mess that it would be so difficult to pass the aspirating needle. The fever continued from ½ to 3° F. I tried to relieve pain and treat the general

symptoms. In a few days aspirated, or tried to do so, but could get nothing. The bulging above pubis extended almost to umbilicus. Her condition appeared anything but favorable. I began to think we had a blood tumor to deal with, but could not feel positive of my diagnosis as I could get nothing from the tumor with the aspirator to make the matter plain. I continued to watch, wait, support and treat the general symptoms until July 10th. I had my friend Dr. J. J. Dial, of Sulphur Springs, to see her with me, and frcm the history of the onset of the disease, suddenness of the attack, paleness, fainting, pain, etc., he jumped immediately at almost a positive diagnosis of a pelvic hæmatocele, and I felt sure that he was correct, yet I had overlooked until then this very important diagnostic symptom. We did not then use the long aspirating needle as I had at the beginning, or I am sure we could have reached the broken down mass, but we used a hypodermic needle, which was too short to reach the clots which were then broken down. In three more days I aspirated and withdrew about one and a half pints broken down offensive blood. Had to pass needle through a very hard mass for more than an inch before reaching the broken down clots; passed the needle just behind the os. In four more days, July 17th, I again passed the aspirating needle in same position as before, and just so soon as the broken down clots began to pass, used the needle as a guide, and made a puncture with a long-bladed bistouri, and then with common dressing forceps tore the parts sufficiently open for the greater part of the mass to be turned out, which looked to be about eight or ten pints. I irrigated the cavity with an antiseptic solution, put in double drainage tubes, one large the other small and long enough to reach externally, that I might with ease attach the irrigator; the small tube after irrigating to be coiled and pushed in vagina, after which a loose packing of iodoform cheese cloth was applied and left until next day. Considerable blood clots passed for several days, but temperature became normal second day after puncturing. I washed daily for several days, took out tubes

August 7th, three weeks from time of operation. She continued to improve, and was soon well and able to go on a visit.

I wish again to call especial attention to the fact that it is very important not to overlook the history of the onset of the disease, that is, the suddenness, fainting, paleness, etc., and that the blood can be so impacted that it is very difficult to pass the needle.

DISCUSSION.

Dr. F. D. THOMPSON: "I would like to ask the doctor several questions relative to the history of the case."

DR. T.—"Was the patient a married woman?"

DR. K.—"Yes."

DR. T.—"How many children has she had?"

DR. K.—"Six."

DR. T.—"How long since her last confinement?"

DR. K.—"The last child was nursing—twenty months of age."

DR. T.—"Had she any uterine or tubular disease?"

DR. K.—"Not that I know of."

DR. T.—"Was there any flow from the uterus at the time of the occurrence of this pain?"

DR. K.—"None at all."

DR. THOMPSON: "My object in asking these questions was to develop whether or not this hæmatocele was due to the rupture of an impregnated Fallopian tube. The doctor does not describe the tumor sufficiently to enable us to determine whether the hemorrhage was intra-peritoneal or extra-peritoneal. However, he spoke of it as an hæmatocele, which would indicate that he believed the hemorrhage was within the peritoneal cavity. If it were extra-peritoneal, it would come under the head of pelvic hæmatoma. We know that nearly all cases of pelvic hæmatoma and pelvic hæmatocele are due to extra-uterine pregnancy. I think it very probable that the doctor had a case of extra-uterine pregnancy to deal with."

DR. J. E. THOMPSON: "Being unable to hear Dr. Kirkpatrick distinctly, I hope the members of the association will excuse me if I have misinterpreted some of his statements. There can be no doubt that puncture per vaginam has cured many cases of pelvic hæmatocele, but that does not necessarily make this proceedure a proper one. My experience of vaginal puncture has been a terrifying one and I am not

likely to repeat it again. I believe most firmly in a cœliotomy, thorough exploration, removal of the blood clots and securing the bleeding point, either by removal of the ruptured tube, or by packing the blood sac, rendered aseptic, with iodoform gauze. Puncture by the vagina is a reversion to obsolete methods and is not to be recommended."

DR. WALKER: "The case reported by the doctor has been of great interest to me on account of a case that occurred to me in my practice about four months ago of the same character. I have had the misfortune, you might say, to meet with two cases of extra-uterine pregnancy. One case was ruptured in abdominal cavity and unfortunately it did not present in the cul-de-sac. That case I operated on and she promptly died. The next case occurred about five months ago in my practice, and I had partially made a diagnosis of tubular pregnancy, and on the succeeding day, or rather the night following the evening in which we had made an examination under anæsthesia. She gave me the history of having had an accute attack of pain with some shock, undoubtedly rupture in the cul-de-sac. I told her I thought it was caused by uterine pregnancy, and advised operation. She would not consent as she had heard of my former case. Now I don't agree with Dr. Thompson in regard to an operation through the vagina. I think in a case of ruptured tube where the ovary—and you know in those cases of hæmatocele they are all from tubular pregnancy, although you don't find a fœtus—I believe they are originally in the tube, and there is no better plan than a good, big, free incision behind the cervix, thorough washing, and all attention to antiseptics and good treatment. Of course, if we recognize tubular pregnancy before there is a rupture, we are all of the opinion and are justified in making a cœliotomy, but while it is not the opinion of most of the authorities of the day, I am satisfied that we have no better procedure than an opening through the vagina with proper drainage.

In the above case a free incision was made behind cervix, blighted ovum, about six weeks, removed piece at a time. Twenty-four hours afterwards four hemorrhages, very active, came up. I was called early to the hospital, and the woman was almost beyond relief, but by packing with the gauze and using an injection of salt solution, I succeeded in saving the patient. She got along nicely, and I saw her week before last and she has entirely recovered. I merely want to say we had no better way of treating these cases than by good, free incision through the wall of the vagina. I want to thank the doctor for the report of his case, because it is just from those cases that we derive benefits from this medical association."

DR. SAUNDERS: "I have been very much interested in the report of Dr. Kirkpatrick's case. The reading of the paper and discussion of

the case have developed a very interesting question indeed. The most interesting point would appear to me to be: What will the ordinary practitioner do in such a case? The question is not, as I understand it, what an expert gynecologist would do, but what the average member of this section—the man from up the creek, from the brush—would do to save his patient. Gentlemen, it must not go out as the consensus of opinion of this section that to puncture the vagina and let out the blood is an unsafe method of treatment. For the average man this is the treatment. I am not condemning laparotomy, understand, but the question whether laparotomy will be beneficial, if even allowable, in such cases, depends upon the surrounding circumstances and who is the man that is going to do it. The average man who has not had large experience in abdominal surgery had better puncture the vagina and trust to drainage, cleanliness and the Lord.

REPORT OF A FEW SURGICAL CASES, WITH REMARKS ON PRACTICAL POINTS.

J. B. S. HOLMES, M. D.,

ATLANTA, GA.

I herewith beg to submit a condensed report of a few surgical cases, all done in private practice:

CASE I.—*Nephrectomy for Sarcoma*—On April 6, 1894, Mary N., aged thirteen months, was brought to me for examination. Her family history good, free from tuberculosis, cancer or syphilis. She was rather small for her age, but in good health up to early in January, three months before I saw her. At that time she became irritable, and suffered considerable digestive disturbance, accompanied with loose bowels. Her mother at this time detected a small tumor, about the size of a hen's egg, in the right lumbar region. She consulted a family physician, who diagnosed the case as enlargement of the liver. The child continued under his treatment until the latter part of March. She was then carried to my friends Drs. R. M. Harbin, of Calhoun, and W. C. Nixon, of Nannie, Ga. Both gentlemen kindly referred the case to me. After a thorough examination, my diagnosis was given as sarcoma of the right kidney. The child was brought to my sanatorium on the 9th inst., three days later, for operation. A dose of oil was given, with instructions that nothing be allowed for nourishment except its mother's milk, and nothing to be taken on the following morning. The next day, after an all-over bichloride bath, the abdomen was thoroughly cleansed with oil of turpentine, tincture of green soap, and then again using bichloride. Nephrectomy was done by making an incision, beginning near the lower border of the eighth rib and extending down on the outer side of the linea semilunaris to near Poupart's ligament. As the tumor was quite large, pushing the peritoneum far over to the left, I had hoped to do an extra peritoneal operation, but, in making my incision and reaching the capsule, I found it so firmly adherent to the peritoneum as to be unable to separate it without doing great and serious damage, and perhaps lacerating this membrane. Again, on account of the immense size of the growth, I was unable to

enucleate it without going into the abdominal cavity. I was forced to make a transverse incision, extending from about the middle of the longitudinal one, three inches in each direction. After considerable difficulty the capsule was detached from the peritoneum and the tumor turned out. It was my purpose to have ligated the artery and vein together and the ureter separately, but as considerable time had been consumed in breaking up the adhesions, I ligated the ureter and vessels en masse, using silk. The peritoneum was closed, without flushing, by a running suture of fine silk. A drainage tube of rubber was placed in the lower angle of the wound, which was thoroughly cleansed with sterilized water, before closing. The incision was closed with deep sutures of silk worm gut, which, however, did not include the peritoneum. It was dressed with sterilized gauze with bichloride cotton on it. The tube was removed at the end of forty-eight hours. The patient was put to bed in good condition, having lost not more than an ounce of blood. At the end of twelve hours her temperature had reached 100°. The following day, at 3 p. m., twenty-eight hours after operation, her temperature had reached 102½°, considerable distention of the abdomen, but no gastric disturbance had shown itself. I gave her one grain each of calomel and soda, with instructions that one-half grain of each be given every four hours until three grains had been given, or until the bowels had freely moved. The first dose acted freely within three hours, she passing six immense lumbricoid worms within the next twelve hours. The following day her temperature was normal and so continued until the fourth day, when there was a slight elevation, reaching 100°. I examined the dressings and found some redness at one stitch, which had been drawn too tight. This was removed and a little pus escaped, when her temperature in six hours dropped to normal and so continued. On the sixth day every alternate stitch was removed; the remainder the day after. With the exception of the one stitch-hole abscess, the incision healed without suppuration. No opium was given, and she took no nourishment except her mother's milk. After the first twenty-four hours she had water *ad libitum*. The tumor with the kidney weighed three and one-fourth pounds. The kidney rested almost as a flattened shell upon the surface of the tumor. The patient returned to her home in three weeks. She continued in excellent health until March of the present year (1895), when she died of acute pneumonia.

CASE II.—Captain D., aged fifty-six, Alabama; came to my sanatorium October 20th; intensely weak, pulse 130, temperature 102°, swelling in right iliac region as large as a fœtal head. He stated that two weeks before he was seized with a severe pain about three inches to the right and a little below the umbilicus, accompanied with high

fever, constipation and vomiting. He was treated for liver disease until he became so alarmed about his condition, that as ill as he was, he left home and came to Atlanta, consulting my friend Dr. E. H. Richardson, who promptly referred him to me. Upon examination I diagnosed perforated appendicitis, with suppuration. His condition was so extreme that I operated within an hour after he came into the sanatorium. He was given a hypodermic of strychnia, one-thirtieth of a grain; the skin over the abdomen was cleansed thoroughly with oil of turpentine, green soap, and then a bichloride solution 1 to 1000. An incision was made from McBurney's point, extending two inches downward. Just as my knife entered the abscess sack he coughed, and the pus spurted at least three feet high. About a quart of extremely fetid pus was discharged. The cavity was thoroughly irrigated with boiled water, after which peroxide of hydrogen was freely used and the cavity packed with iodoform gauze. I did not search for the appendix, which I am sure had been entirely destroyed by suppurative process. The dressings were removed each day and peroxide of hydrogen used and the packing of iodoform gauze reintroduced. His improvement was continuous, and he left the sanatorium November 19th with the wound entirely healed, and he was in excellent condition. His health has continued good, as letter dated April 11th states. This case illustrates how wisely and well nature takes care of her subjects. This old gentleman had traveled more than 300 miles with only a thin membrane between him and eternity; for had this ruptured, and the contents of the pus sack gone into the peritoneal cavity, how soon would septic peritonitis have ended his life.

CASE III.—Mrs. C., aged twenty-one; Nullip. Kentucky; married two years; began to menstruate at fifteen and without pain until marriage. Up to marriage had been in excellent health, weighed 143 pounds. Soon after marriage suffered an attack of pelvic peritonitis, and from that time until she came under my observation, her health had steadily given way, and when I saw her she only weighed ninety pounds. Suffered with insomnia, no appetite, poor digestion, constipation, frequent and painful micturition, backache, intense pain in the pelvis, most severe on the left side; constant bearing down sensation while standing or walking. On examination found the uterus firmly fixed, and left ovary and tube very much enlarged, also fixed, extremely sensitive and tender; the right also fixed and enlarged, but not to the same extent. An ovariotomy was done October 20th, and upon opening the abdomen I found the ovaries and tubes adherent to everything within their reach. After much difficulty the adhesions were broken up and the ovaries and tubes removed. The abdomen was thoroughly irrigated with boiled water at a temperature of 105°,

and glass drainage used, the tube remaining forty-two hours. Her recovery was uninterrupted, and she is to-day in perfect health; free from pain, good appetite, perfect digestion, sleeps well and weighs 125 pounds. The left ovary and tube were both filled with pus, the right ovary cystic, and the right tube filled with blood. The cause of the trouble in this case was in my opinion, beyond a doubt, gonorrhœa, the deadliest of all enemies to the health of women. I report the case as a typical one, to show the terrible ravages that it can commit in so short a time. I could report a number of such cases.

CASE IV.—Mrs. H., aged thirty-two; Mult. North Carolina; menstruation profuse and intensely painful; severe headache, insomnia, acute pain in back, bearing down sensation in pelvis, inability to stand or walk. Had not walked a step in nine months. A confirmed opium habitue. Upon examination I found the right ovary prolapsed and fixed in Douglas' cul-de-sac, and I think the most sensitive of any that I have ever touched. The left ovary was prolapsed and cystic, about size of a hen's egg; uterus retroflexed and considerably enlarged. On November 22d I removed both ovaries and tubes, elevating the uterus by shortening the round ligaments, which were included in the ligatures encircling the ovarian pedicle. She left the sanatorium December 24th, free from pain and walking without discomfort. She is now (April 1st), as a recent letter states, attending to her household duties and in perfect health. Was entirely free from the opium habit before leaving the sanatorium, and has so continued. This patient had had local treatment for nearly two years before coming under my care.

CASE V.—Mrs. D., aged thirty-six; Mult.; Florida; menstruation regular, but with great pain, violent headache, insomnia, no appetite, poor digestion, constipated, nausea, intense pain in back and lower abdomen, extending down thighs; unable to walk, and had been confined to her bed for six months; an invalid for fifteen years. Upon examination I found floating kidney on the right side, uterus enlarged and retroflexed; right ovary the size of a guinea's egg, firmly fixed in Douglas' sac; the left ovary prolapsed, cystic, sensitive. Ovariotomy was performed December 18th, removing both ovaries and tubes and elevating uterus. Her convalescence from the operation was satisfactory in every particular. On February 5th the right kidney was anchored. I made an incision about two and one-half inches from the spine, beginning at the lower border of the twelfth rib, and extending three and one-half inches in an oblique direction toward the crest of the ilium. When the kidney was exposed the capsule was incised and folded back one-fourth inch on each side. Four silk worm gut sutures were passed through the muscles, the fatty capsules of the kidney and through the kidney tissue. Twelve strands of silk worm gut were

placed on the kidney and brought out at the upper and lower angles of the wound. The kidney was pressed firmly in position by the hand of my assistant, then three additional sutures of silk worm gut were passed from the skin through the muscles, fatty capsule and kidney tissue. The four deep sutures were drawn moderately tight and tied, cut close, and the cutaneous wound closed by the three deep sutures and several superficial ones. A dressing of sterilized gauze and absorbent cotton was applied over the wound, and a pad of gauze was applied over the kidney, on its anterior aspect, and held in position by rubber straps passing half round the body. On the eighth day the silk worm gut threads were removed and also the sutures. Perfect union had taken place throughout the entire length of the wound. The abdominal pad was worn for about thirty days. At this date (April 9th) the kidney remains firmly fixed. She has gained wonderfully in strength and flesh, is relieved of all pain, eats and sleeps well, walks wherever she pleases about the sanatorium, and will return to her home Saturday, the 20th inst. This patient had been a victim for ten years of iodine, iodized phenol, carbolic acid, nitrate of silver, "*et id omne genus.*"

CASE VI.—Mrs. H., aged thirty-five; Nullip. Georgia; menstruation began at sixteen, always painful and very profuse; severe headache, no appetite, poor digestion, constipation, painful urination and a feeling of constant pressure on the bladder. Suffered for three years with intense pain in abdomen, much greater in the region of the ovaries; extremely nervous and excitable, great mental disturbance. Had been treated locally for three years. On examination I found the uterus enlarged and fixed, the right ovary as large as a goose egg, tube very very much enlarged, and both firmly fixed; the left ovary and tube also fixed, the tube considerably thickened and ovary cystic. Ovaries and tubes removed December 21st. Adhesions were very dense and strong, and appendages were removed with the greatest difficulty. The right ovary was ruptured and a large quantity of dark colored fluid discharged. The abdomen was thoroughly irrigated with boiled water and glass drainage used, the tube remaining in twenty-four hours. The right tube, upon examination, was found filled with blood, the left ovary and tube filled with serum; both tubes entirely occluded. Ovaries and tubes studded with papillomatous growths. Union of the abdominal incision in this case was interrupted by several stitch-hole abscesses, produced, no doubt, by the stitches being too tightly tied. She left the sanatorium January 23, since which time she continued to improve, and is now in full control of the care and management of a large hotel. This patient had been treated locally for three years be-

fore coming to me, growing worse all the while. When she came to me she was both a physical and mental wreck.

CASE VII.—Mrs. M., aged twenty-eight; Nullip. Georgia; intense headache, appetite variable, digestion very poor, bowels constipated, no trouble with bladder; menstruation regular, but intensely painful; severe backache; pain in lower part of abdomen, but much more severe on the right side; had been bed-ridden for five years; very weak and anæmic. On examination found right ovary very large, extremely sensitive and about the size of a guinea's egg. Left tube and ovary both prolapsed and firmly fixed by inflammatory adhesions. This patient had had several well defined attacks of pelvic peritonitis. Both ovaries and tubes were removed January 5th. The adhesions were particularly dense and strong, especially on the left side. The abdomen was thoroughly irrigated with boiled water, and glass drainage used, the tube remaining twenty-seven hours. Both ovaries were filled with a cheesy mass, evidently tubercular in character. Both tubes contained a small quantity of the same material. She has a tubercular history. She left the sanatorium March 2d, strong enough to walk where she pleased about the building, eating and sleeping well. Her improvement has been continuous and satisfactory since her return home. She had been treated locally for five years.

CASE VIII.—Mrs. S., aged thirty-five; Mult. Georgia; Monday afternoon, February 11th, while walking across her sitting room, was suddenly seized with an intense pain in the left iliac region. The pain was so severe that she had to be lifted to bed in a swooning condition. Her husband, who is a physician, immediately gave restoratives and anodynes and invited two professional friends to see her. She continued to suffer during the night, and notwithstanding the free administration of stimulants, she grew weaker and her condition very alarming. On the following day there was no improvement, except the suffering was not so acute, pulse rapid, expression anxious and some distention of the abdomen. On the following morning there was still more prostration, with considerable distention of the abdomen, and tenderness; pulse extremely weak and rapid; a well defined peritonitis. Additional counsel was called and a diagnosis of peritonitis concurred in. There was no improvement in her case, and I was summoned to her home in South Georgia, Wednesday night, the 13th of February. I arrived at 1 p. m. on Thursday. Found the patient with a temperature of 102° and pulse 135, extremely palid, expression anxious, very great distention of abdomen, respiration hurried and embarrassed. The following history was given me. Had been in good health and menstruated regularly, the last regular period occurring eleven weeks before I saw her. Four weeks subsequent to that period

the flow came on rather scant and lasted only a day or two. At the regular time it again returned, three weeks before I saw her; this time not so free and lasting only one day. She had suffered some with morning sickness, but not enough to make her think she was pregnant. In passing my finger into the vagina, I detected a large, boggy mass, filling up the left side of the pelvis; the uterus considerably enlarged and pushed far over to the right. I immediately diagnosed tubal pregnancy, with rupture, and urged immediate operation. The husband agreed with me, but the attending physicians differed, and opposed surgical procedure. The patient herself, after having everything explained to her, also declined operation. I could not leave her home before 1 o'clock the following morning. Before the hour of my departure, as she had continued to grow weaker, the husband came to me and said that he felt it his duty to urge an operation upon his wife. He did so and she consented. Strychnia had been given her—hypodermically—freely from the time I saw her, and every preparation was made for operation in the early morning. Her bowels, in the meantime, had been thoroughly evacuated by copious enemata. Early on the morning of the 15th of February, four days after the rupture, in anything but a promising condition, she was anæsthetized and the operation done. Upon opening the abdomen the entire cavity was found filled with coagulated blood. Enough was removed to find the ruptured and bleeding tube. This was promptly ligated and removed. The coagulated blood (a large wash basin full, I presume, but did not stop to measure it, as her condition was so extreme) was removed, the abdomen thoroughly irrigated with boiled water at a temperature of 105°, and glass drainage used; the tube remaining in twenty-five hours. I regret not being able to find the fœtus, which had escaped from the tube into the abdomen, and there doubtless macerated. The operation was done so hurriedly that the clotted blood, when removed, went from the abdomen to the slop basin, which was emptied before I had an opportunity to examine it. She was put to bed in almost a moribund condition. Strychnia and whiskey were freely used and a hot saline solution thrown into the bowels. I should have used saline infusion into the veins, but had no instrument with me for doing so. She rallied in a few hours, and her recovery was satisfactory in every particular. I had the pleasure of dining with her on the 4th inst. She is entirely well and able to go where she pleases, but, of course, still weak and anæmic.

CASE IX.—Miss H., aged twenty; Georgia. I regret that this patient could not tell the age at which she began to menstruate. She reports, however, that the flow has always come on regularly since it began and always accompanied with pain. About a year ago she noticed

some swelling in lower part of abdomen. For the last six months it had increesed considerably, and given her great pain; so much so as to require the frequent use of anodynes. Within the last three months the abdomen has been so large as to make it quite noticeable. She was sent to me for operation upon a supposed ovarian cyst, and from an examination of the abdomen alone a diagnosis of that kind could easily have been made. The fluctuation, however, was quite indistinct, if felt at all. Upon examination I found the fluctuating point at the base of the bladder about one and one-half to two inches below the meatus. My finger, passed high into the vagina, could just touch the cervix. On March 9th a free incision was made at the point of fluctuation. She must have discharged quite three quarts or more of dark grumous material, evidently retained menstrual blood. After the cavity was thoroughly emptied, I caught the cervix with a vulcellum forcep, drew it down and passed the sound in it, at the same time passing the index finger of my left hand through the incision into the cavity just emptied. I could distinctly feel the point of the sound with a membrane intervening between it and my finger. I withdrew the sound, passed the uterine dilater through the cervix and perforated the septum. I dilated the cervix and dilated the opening made in the septum. I then passed two rubber drainage tubes through the cervix and through the opening in the septum and out at the point of the incision in the sack. The sack was thoroughly irrigated with boiled water at a temperature of 105°, and well packed with iodoform gauze. The gauze was removed once a day, each time irrigating the cavity and repacking. The drainage tubes were removed on the third day. The irrigation and packing of the cavity was kept up for seven or eight days. The cervical canal was kept well dilated, allowing the drainage to pass off through it. She was relieved, and the incision had entirely healed when she returned home March 30th. This was to me a very interesting case, clearly one of bicornate uterus, with one cervical canal and a septum dividing the two cornu of the uterus. Undoubtedly this hæmatometra had existed since she first began to menstruate.

CASE X.—Mrs. K., aged twenty-seven; Nullip. Georgia; began to menstruate at sixteen; no pain for a year, since which time has always suffered intense pain during menstruation, which had continued usually about three days. Appetite poor, digestion very bad, severe headache, very nervous, bearing down pain in abdomen, worse on right side and greatly increased since her marriage seven years ago. Could not walk or stand without great suffering. On examination I found right ovary and tube firmly fixed in Douglas' sac, and ovary considerably enlarged and extremely tender. Left ovary quite tender, somewhat enlarged,

but in normal position. Ovaries and tubes removed March 12th. Patient put to bed rather weak and was given a hypodermic of strychnia one-thirtieth of a grain once in three hours, and at the end of twelve hours it was discontinued, as her condition was good. She suffered intensely for the first few hours, so much so as to require two hypodermics of morphia, one-fourth grain each, one given ten and the other fourteen hours after the operation. These relieved her entirely, and during the next twenty-four hours her condition was good in every particular. On the morning of the third day (the 14th) she vomited quite freely. As no gas was passed up to this time, she was given a high enema of soap and water, which passed away without bringing any fœcal matter or gas. She was given one-half grain tablet of calomel every half hour until twelve doses had been taken, and strychnia given in one-thirtieth grain doses every three hours, without the passage of either fluid or solid contents; indeed, there was no peristalsis. I began to suspect intestinal obstruction either from lymph bands, twisted bowels, or union to the ovarian stump. Her vomiting continued to grow worse, and at noon, fifty hours after the operation, she was given ten grains of calomel, which was repeated in three hours, but as she vomited freely, I dare say, but little, if any, was retained. She was then given Seidlitz powders, which she also failed to retain. During the afternoon and night of the third day she had a number of enemata of soap and water, turpentine, ox gall, etc. I was thoroughly convinced by night of the intestinal obstruction. Her pulse began to show evidences of failure and intervals between the strychnia was reduced to two hours. Friday morning, four days after the operation, there was some improvement in the circulation, she was resting some, sleeping a little, and not vomiting so frequently; still no peristalsis. By noon the pulse had increased in frequency and lessened in volume, and I decided that we had waited as long as it was prudent and safe—that something must be done or death would snatch her from us. At 4 p. m. the abdomen was reopened. Perfect union had taken place in every part of the wound. The ilium at about its middle was firmly attached to the ovarian stump, on the right side. It had looped around about eight inches and attached itself again, producing a complete obstruction by lymph bands around the bowel. The adhesions were loosened, the lymph bands divided, and every portion of the intestinal tract thoroughly examined. The abdomen was freely irrigated with boiled water at a temperature of 105°, and glass drainage used; the tube remaining in twenty-four hours. The patient was put to bed in a very weak prostrated condition, having a small pulse of 137. By the free use of strychnia, whisky hypodermically, and hot applications to the body, with whisky and salt water in the rectum, the patient gradually

rallied. From that time her convalescence has been uninterrupted. As I write to-day (April 11th) she is walking around her room and expresses herself as feeling better than she has for several years. She will return to her home on the 15th inst. This patient had had local treatment continuously for five years before coming into my hands. This case clearly illustrates the evil of marrying with pre-existing pelvic disease.

Ether was administered to all the foregoing cases, except Nos. 1 and 4, to whom chloroform was given. Chloroform was also given in the second operation in case No. 10. I believe if the secondary effect of ether upon the kidneys was closely studied, we would find as many or more deaths attributable to it than to chloroform, both primarily and secondarily. The risk of ether is undoubtedly greater secondarily than primarily. Many deaths are caused by it that are attributed to other causes. When carefully used and properly administered I believe chloroform to be quite as safe, and it is certainly much more satisfactory. The struggling of the patient when being anæsthetized is done away with, and the horrible sick stomach which usually follows the use of ether rarely occurs with chloroform. The return to consciousness after taking chloroform is rarely accompanied with vomiting or severe nervous manifestations. I am daily more inclined to the use of chloroform, and expect in the near future to see the tide of professional opinion turn in its favor. Before administering it, if my patient is at all weak, I always give a hypodermic of one-thirtieth to one-twentieth of a grain of strychnia. There is still great diversity of opinion among many able surgeons as to the relative safety of the two anæsthetics in the presence of kidney disease. Some even claim that chloroform produces more renal trouble than ether. I shall always, until experience proves to the contrary, give chloroform the preference in any diseased condition of the kidneys, unless there are potent reasons why ether should be used. I never operate in any case where albumen is shown in the urine in any quantity, without a thorough test for urea and a microscopical examination for casts, unless it be one of great emergency. If the quan-

tity of urine is near normal, and the quantity of urea not notably deficient, hurried operations may be done, even if we have albumen and some casts. If, however, the quantity of urine passed is small and the amount of urea notably deficient, I would only operate for pus accumulations or very large tumors producing severe pressure symptoms. Where diagnosis can be satisfactorily made of chronic interstitial nephritis, which is a very difficult thing to do, all operative procedures are contra-indicated. Where I have them under control I like for my patients to flush the kidneys for three or four days preceding operation with Lithia water, and I always use it for two or three weeks afterward. It is always well, before surgical procedure, in those cases where you have the preparation of the patient, to see that the skin is clean and in an active condition. We are all in the habit, I am sure, of giving too much ether and chloroform. If properly used, after the patient is thoroughly anæsthetized, very little is required to keep up complete anæsthesia.

I find strychnia in surgical work the most reliable of all heart tonics. Where the patient comes under my care early enough, unless she is very strong, I always give one-thirtieth of a grain of strychnia every four to six hours for three or four days before the operation, and if she shows evidence of shock afterward I give it freely, watching for its physiological effects and continuing it for several days until the pulse is sufficiently strong. I consider it far better as a stimulant and heart tonic than brandy, which, however, I also use when required. For surgical shock I have very little faith in digitalis; it has always been disappointing to me. Case No. 8 has impressed me with the importance of always going prepared to use saline infusions, which have, I think, a most valuable place in the treatment of shock from loss of blood.

My experience with cat gut, both for ligatures and sutures, has been unsatisfactory. I now never use it, except where I do a trachelorrhaphy and perineorrhaphy at the same sitting. It is hard to sterilize, is soft, slips easy, and therefore hard to tie

with any assurance of safety, and, besides, it is frequently absorbed earlier than we would like.

I have used many of the prepared foods, different broths, lime water and milk, peptonized milk, etc., after abdominal operations, but if I was restricted to one article of diet for these cases I would select buttermilk. I find many patients who in health could not use it at all, after a laparotomy take it with the greatest relish, and it is extremely rare that I find one with whom it disagrees.

As a hypnotic I have found nothing so satisfactory as ten to fifteen grains of trional, repeated in an hour if sleep is not produced. The use of it has not been followed by any unpleasant secondary symptoms.

As a purgative after an abdominal operation, I am more in the habit of using Epsom salts than any other remedy. Experience proves it to be the most satisfactory to me of all laxatives. I usually give it in three dram doses, repeating every three hours until bowels move. I have used it hypodermically in two cases only; one satisfactorily, in the other no effect was noticed.

I have always depricated the use of opium, especially in abdominal work, and have used it with great care and caution. An increasing experience teaches me that those cases where it is not given at all do much better, and their convalescence is more satisfactory in every respect. While the pain after abdominal sections is frequently severe, it rarely continues but a short while. Where the pain is so intense and threatens to exhaust the patient from continued suffering, I think it advisable to use it in moderation. I think many of the cases of bowel obstruction, whether due to paresis, lymph bands or adhesions, are traceable to the use of opium. I am convinced that the adhesions in case No. 8 where the abdomen was reopened, where due to the paralyzed or quiescent condition of the bowels, so rendered by the two doses of morphia given after the operation. While all peristalsis was arrested and the bowel lying quietly against the ovarian pedicle, the lymph was rapidly pouring out and the constriction produced. Had the peristalsis kept up no adhesions would have

occurred. Just here let me enter a plea for the early reopening of the abdomen in all cases of diagnosed or strongly suspected post operative obstruction. Do not let your patient die without giving her a chance for life; reopen the abdomen, find the obstruction and relieve it.

In my laparotomy cases, where it has been necessary to elevate the uterus for retroflection or retroversion, I have done so by shortening the round ligaments, by including them in the ligatures that encircle the ovarian pedicle. In the few cases in which I have done this the uterus has remained well forward, while it is still allowed free movement. It is not fixed against the bladder, causing great irritability of that organ that ventrofixation sometimes does.

In doing ovariotomy, I in no case operate simply for nervous and reflex symptoms. I operate only for a diseased condition that I am sure can be relieved only by surgical procedure. Careful examinations, post-operative, have confirmed my opinion in every instance, in all the cases upon which I have operated.

While I believe in conservative measures, the most radical are often the most conservative. I am ready to admit that the abdominal cavity has often been ruthlessly invaded and organs removed for nervous symptoms due entirely to other causes and for which they were in no wise responsible. On the other hand, tinkering gynecology, I am sure, is responsible for many diseased tubes and ovaries that can only be cured by removal. The introduction of various caustic remedies into the uterus, causing destruction and sloughing of the mucous membrane, with a cervical canal in many cases previously constricted, or so rendered by the applications, that the decomposing masses can not pass out. What follows? A septic endometritis, which soon extends to the tubes and ovaries, producing trouble that nothing but the knife will relieve. This must be resorted to, or the poor woman is frequently doomed to permanent invalidism; a condition sometimes worse than death. Many of the cases that the surgeon is censured for using the knife upon are caused by such treatment.

I do not condemn all local treatment. Properly directed, I believe there are many conditions where it is not only admissible, but demanded. Often in these conditions cures are made, especially where the local treatment is supplemented by constitutional measures, for oftentimes local troubles are clearly the result of constitutional vices. I do condemn, however, in the strongest terms, the reckless, haphazzard and indiscriminate introduction of the various caustics into the uterus; certainly none should be introduced, without first providing for thorough drainage. The want of cleanliness on the part of many physicians when making vaginal and uterine examinations is often a potent factor in causing uterine and pelvic disease. Not only should the hands and instruments be clean, but the vagina and cervix should be thoroughly cleansed and disinfected before an instrument of any kind is passed into the uterus. How many of you have seen your professional brother swab the uterus with all sorts of medicaments, using dirty cotton on an equally unclean applicator, never cleansing the vagina and cervix, and even passing a sound into the uterus that had been passed in perhaps a dozen others without coming in contact even with soap and water. While the uterine sound is a valuable instrument in its place, there are but few instances where it is required. I believe it has done more damage to women than all other instruments combined, and it not only has been, but is still too indiscriminately used. Stem pessaries have made many victims for the surgeon's knife. With the possible exception of the uterine sound, they have done more harm than any other instrument or appliance.

Understand me, I do not think that every diseased ovary should be removed; far from it. I decline operation in many cases where the patient is anxious for it. I try to be conscientious and operate only where the disease is so far advanced that it has or is likely to render the woman an invalid, and is incurable by any other means. There are many other points I would like to discuss, but the length of this paper forbids.

SECTION ON OPHTHALMOLOGY AND OTOLOGY.

R. E. MOSS, M. D., CHAIRMAN.

SAN ANTONIO.

MR. PRESIDENT AND GENTLEMEN—In complying with the time honored custom, as chairman of the Section of Ophthalmology and Otology, of giving a resume of the progress made during the past twelve months, I have purposely made my paper very brief.

There are some interesting papers to be read, which will prove more instructive doubtless than listening to what many of you have read.

Darier, of France, and Grossman, of Budapest, speak very highly of subconjunctival injections of bichloride of mercury, 1-1000 and 1-30,000 in post operative and traumatic infections, such as ulcerative keratitis, gumatous, granular and rheumatic iritis, infectious iridochoroiditis, retrobulbar and infectious optic neuritis, optic neuritis of unknown origin and sympathetic ophthalmia. This comprises quite an important group of eye troubles that heretofore have practically been left to themselves, so to speak, unless of specific origin, and we should welcome a remedy that has the enthusiastic endorsement of such men.

Antitoxine is spoken of very highly in the treatment of ocular diphtheria by Dr. Coppez.

Dr. Dubar reviews the treatment of all forms of conjunctivitis with crude petroleum, as introduced by Trousseau.

Formal is one of the latest and much lauded antiseptics in ocular practice. It is claimed to be much superior to bichloride and used in the strength of 1·200 with marked benefit.

The surgical treatment of trachoma shows many relapses, and total loss of vision at times results from unlooked for complications. The most perfect and beautiful results are obtained in the follicular variety by expression with the Knapp roller forceps. Kenneth Scott, of Cairo, Egypt, alludes to the use of four per cent aqueous solution of cyanide of mercury brushed over the lids every day, and the instillation of one-fourth per cent several times daily. He claims that it is almost a specific, and reports his cases cured in three to six weeks.

The concensus of opinion with conservative American, as well as foreign ophthalmologists, is against the partial tenotomy theory of Stephens and his followers in the treatment of muscular insufficiencies. The vast majority are due to errors of refraction; next comes systemic disturbances, the innervation theory, and those of nuclear origin. Therefore, the number requiring tenotomy, except in cases of squint for cosmetic effects, are quite small indeed.

The immediate results of tenotomy in highly nervous individuals suffering from asthenopia is indeed brilliant, but, in a few weeks or months the trouble returns, unless thorough systemic treatment has been carried out.

In carefully reviewing the statistics of cataract operations and the final results in regard to amount of useful vision obtained, it would seem decidedly in favor of simple extraction; that is, without iridectomy. There is a difference of opinion, however, in simple extraction, whether the posterior capsule should be divided immediately or wait three or four weeks and no discission. The operation of discission has proven disastrous in the hands of some operators, but I never observed any bad results in at least a hundred cases that I saw operated by Knapp.

Eugene Smith, of Detroit, speaks in high praise of morphine in simple extraction, given hypodermically to prevent prolapse of iris, the much dreaded complication. He instils a drop of eserine solution immediately after extracting the lens, gives one-eighth grain of morphine, then allows patient to walk to his

bed before putting on the dressing, and repeats the hypodermics twice afterwards, at intervals of six to eight hours.

Wilder, after carefully studying 161 cases of brain tumor with a view of determining what value can be ascribed to optic neuritis, as a diagnostic sign, comes to the following conclusion: That an intracranial growth does not cause optic neuritis by increased pressure within the skull, but those which produce the most irritation to the brain or meninges. It may be due to a descending inflammation of the nerve fibers, as suggested by Gowers, or by morbific material carried through the fluids in the nerve sheath as claimed by Leber. The papillitis is most marked usually on side of tumor. He advises early and repeated ophthalmoscopic examinations with records of the visual field and color tests.

Dr. Okauneff suggests an additional aid in diagnosing pus accumulations in the mastoid. There are many cases where an operation is plainly indicated, and others where there are no symptoms pointing to pus accumulations. He urges the use of the otoscope, one end in the operator's ear, the other slipped over the end of a small sized Politzer speculum, which is applied to various points of the process to be examined. an physician strikes a tuning fork and places it on the [illegible] Healthy bone gives a clear sound, which is conducted [illegible] through the tube; but if the bone is diseased, the sound [illegible] This test is a very important one, and so far with me has [illegible] very accurate.

Suppurative otitis is proven from reliable statistics [illegible] the simple thing that the majority of practitioners [illegible] Pitt found in 9,000 consecutive autopsies at Guy's [illegible] suppurative otitis was the cause of death in [illegible] cases; while Baker, out of 8,020 autopsies, found [illegible] cases. Bezold found one and one-half per cent [illegible] cases of suppurative otitis; while Barker, in [illegible] two-fifths per cent of deaths. The operations [illegible] chronic suppurative otitis have been so successful [illegible] the Swartze or Stacke method has been followed [illegible]

not hesitate to insist upon an operation in any case of suppuration of the middle ear after careful, thorough treatment for six weeks or two months. In acute cases it is better to do the ordinary mastoid operation, breaking down all the cells and opening the antrum, thereby establishing a free communication through the antrum, middle ear and external canal.

We have some interesting papers on this subject; therefore, will not describe further the details of operation.

The operation, however, for otitic brain abscess and sinus thrombosis is of such great importance and comparatively of recent date that I shall feel justified in giving a practical synopsis of the operation, and the depth we are safe in exploring the brain in the different locations for abscess.

The temporo sphenoidal lobe is the situation that experience has shown in which the majority of otitic abscesses, about sixty-six per cent, are located. Unfortunately, abscesses in this location may and often do cause death before there are any motor or sensary disturbances to guide us in deciding its location before operating. It is well, however, in all cases to begin by thoroughly opening the mastoid sinus and the dura, both above and below. This enables us to gain access to the cerebellum and the middle fossa. If no focus of infection be found, we should chisel away the upper posterior wall of external canal into the drum cavity. The roof of mastoid is also chiseled away so we can raise the dura and brain to expose the tegmen tympani et antri. This enables us to seek for carious bone or fistulous opening in dura.

If we find no fistulous opening or adherent dura, we should remove the bone upwards and backwards with rongeur forceps or chisel, and then with large needle or aspirator explore the brain in different directions if necessary for abscess. We should first explore just above petrous bone, being careful not to go vertically inwards more than 2 to 2½ c. m. for fear of wounding the inferior horn. After we have located the abscess it is best to incise the dura freely; also the brain should be opened with the knife down to abscess cavity, and then opening enlarged

with dressing forceps. The cavity should be irrigated very gently with warm Thiersch's solution or boric acid solution, and then gauze or a rubber drainage tube inserted. If, however, we fail to find a fistula or discolored adherent dura to guide us, and we have to guess at the situation, there is no reason why we should not explore carefully in all directions with the needle. If this be done cautiously, keeping in mind the anatomy of the brain and not puncturing vertically, unless high up, deeper than 2 to 3 c. m., we have not exposed our patient to any special risk from the operation; and, as we know, death is inevitable unless the abscess be emptied. If we operate an inch or more in front of the meatus we can penetrate vertically 3 to 3½ c. m. If we operate about the upper limit of the temporal lobe, we can go to the depth of 4 to 5 c. m., but just in front, immediately above or back of the meatus, it is not safe to penetrate more than 2 to 2½ c. m.

We should be exceedingly careful to avoid injuring the internal capsule and ventricle.

For a detailed description of the technique of the operation I would refer you to a very carefully written article in the January number of the Archives of Otology, by W. Hansberg.

RHINOLOGICAL DON'TS—WHAT NOT TO DO IN NASAL AFFECTIONS.

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Don't speak of nasal catarrh as a disease. It is a symptom of irritation of the mucous membrane lining the nasal cavities, and has various causes.

Don't make a diagnosis without a careful anterior and posterior rhinoscopic examination.

Don't forget that the nose is meant to breathe through, and that complete or partial obstructions means mouth breathing and all its dangers.

Don't fail to examine the nasal cavities in all cases of asthma, hay fever, deafness, and chronic cough.

Don't use a palate hook in making a posterior rhinoscopic examination or post-nasal application. If the patient be trained to breathe through the nose, the soft palate will hang perpendicularly and the examination will be easy.

Don't forget to cleanse the nasal cavities before making an examination or medical application. Medicated sprays or insufflations into the cavities lined with inspissated mucus are applied to the mucus and not to the membranes lining the cavities.

Don't use salt water for cleansing, but an alkaline, non-irritating, antiseptic and deodorizing solution of the proper specific gravity to promote osmosis. Bermingham's solution* meets the indications.

Don't use a Thudicum douche or a syringe; nor any apparatus where the *force* of the stream is under the control of the patient.

The Bermingham douche† is simple and has no objectionable features.

Don't forget that all diseased conditions of the nasal mucous membrane will sooner or later produce middle ear disease; and that they may produce asthma and other reflex affections.

Don't permit the patient to use cocaine under any circumstances.

Don't use cocaine except for diagnostic or operative purposes.

Don't forget that a five per cent solution of antipyrine will

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*Bicarbonate of soda.....2½ drachms
Biborate of soda.....2½ drachms
Salicylate of soda.....2½ drachms
Thymol.....2½ grains
Menthol.....2½ grains
Glycerine.....2½ ounces
Alcohol.....5 drachms
Distilled water, sufficient to make 8 ounces.
Oleum pini Syvelstries.....5 drops

M. A half teaspoonful of this mixture should be added to four teaspoonsful of tepid water, just before using in the nose.

† Dr. Bermingham's nasal douche is here represented exact size. It has a capacity of about seven drachms, generally sufficient far a thorough cleansing. It is to be used in the following manner: Fill the

douche with the cleansing solution properly diluted, and at a temperature of about 100° F., close the funnel with the index finger, insert the nozzle into the nostril so that it closes the latter completely, throw

contract the blood vessels, that its action is prolonged far beyond that of cocaine, and that the patient will never contract the cocaine habit by using it.

Don't use cocaine in acute rhinitis. An antiseptic cleansing solution, followed by a spray of five per cent solution of antipyrine, and small doses of quinine and belladonna internally, is the treatment indicated.

Don't use irritating applications to the nasal mucous membrane in hypertrophic rhinitis. Cleansing is of the first importance in the treatment of this condition.

Don't forget that a saturated solution of iodoform and tannin in ether is the best application to make to a diseased nasal mucous membrane. It should be made by means of the spray, both anteriorly and posteriorly to the paryngeal vault.

Don't abandon the iodoform treatment if you do not possess a spray apparatus. Use the compound stearate of zinc with iodoform in an insufflator.

Don't discard the iodoform treatment in hypertrophic rhinitis unless the patient strenuously objects. Then try a five per cent solution of antipyrine, or a one per cent solution of menthol in albolene.

Don't fail to see and treat all hypertrophic cases three times weekly, and have the patient cleanse thoroughly at home at least twice a day.

Don't trust the patient, but ascertain, by examination at each

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the head slightly backward, raise the finger closing the funnel, and allow the solution to enter the nostril and flow through it to the naso-pharynx, around the posterior margin of the septum, until it emerges from the other nostril. This nostril should then be closed with the finger, so as to keep the nose filled with the solution, and the parts bathed in it for two or three minutes. The process should be repeated on the opposite side. Unless the patient breathes through the mouth quietly and naturally all the time he is using the douche, the solution will run down the throat. He will, however, become expert in using it in a day or two. After its use the nose and naso-pharynx should not be bleared for three minutes, when the solution will have drained away.

visit, that he cleanses the nasal cavities thoroughly and properly.

Don't forget that cleanliness is the *sine qua non* in the treatment of atrophic rhinitis. If it be neglected, all other treatment will fail.

Don't fail to operate and restore the caliber of the nasal passages in all cases of stenosis causing total or partial obstruction of nasal respiration.

Don't hope to relieve catarrhal symptoms if stenosis exists, unless you correct the stenosis.

Don't cut or cauterize unless stenosis exists to a degree to obstruct respiration.

Don't fail to distinguish between hypertrophy of the turbinated bone and hypertrophy of the tissues covering the bone. The differentiation can be made in a few minutes by the application of cocaine and pressure with a probe.

Don't treat chronic hypertrophy of the tissues covering the turbinated bones with astringents. Destroy a portion of the tissue with the galvano-cautery if the hypertrophy is anterior. Remove it with the Jarvis' snare if it is posterior.

Don't treat hypertrophy of the turbinated bones with the cautery. Remove a portion of the entire length of the bone with a saw if the inferior is affected; with a wire écraseur if the middle is affected.

Don't use complicated instruments were simple ones will answer.

Don't use a saw to remove small spurs and crests on the carlilaginous septum. The Chappell annular knife will answer better.

Don't use the electric drill or trephine to remove exostoses if the work can be done with a small saw.

Don't use force in using a saw. Simply guide it and allow it to do the cutting.

Don't fail to open an abscess of the septum at the earliest opportunity. You may thereby prevent destruction of the cartilage and deformity of the nose.

Don't remove polypi with the forceps. Use a wire écraseur and cut through the pedicle by turning the screw. Don't pull.

Don't straighten a deflected septum by fracturing and replacing until you have prepared the nasal cavity on the concave side for the encroachment on its caliber. The inferior turbinated bone on this side is generally hypertrophied, in which case a portion of its entire length should be removed.

Don't be in too great haste to plug the nose in cases of hemorrhage after operation. The most copious hemorrhage will usually cease within fifteen minutes.

Don't plug until you have ascertained where the blood comes from, and then place the plug so as to make proper pressure on the bleeding points.

Don't plug with anything except iodoform gauze.

Don't attempt to arrest epistaxis not due to traumatism by astringent injections. Find the bleeding point and touch it with the galvano-cautery.

Don't forget to examine for adenoids in the pharyngeal vault by introducing the finger through the mouth up behind the soft palate.

Don't attempt to treat adenoids by astringents or caustics. The Gottstein curette and the Quinlan forceps will remove them thoroughly. The finger of the operator, introduced behind the soft palate into the pharyngeal vault, will not only locate accurately the smallest growth, but will determine when all are removed. Don't leave the smallest particle behind.

Don't forget that enlarged tonsils obstruct the posterior nares and are a prolific source of nasal and aural disease.

Don't neglect the tonsils in cases of mouth breathing pointing to nasal obstruction. If they are enlarged, remove them with the guillotine or destroy them with the galvano-cautery.

Don't give a general anæsthetic for operations in the nose. You need a good light, and the patient's assistance in removing blood clots. Besides, the added dangers of an anæsthetic, though slight, should be avoided. Cocaine, properly used, is sufficient for nearly all intranasal operations.

Don't neglect constitutional treatment in syphilis of the nose. Tertiary syphilis, the form usually met with, requires large doses of the iodide. Locally, the best treatment is iodoform in spray.

Don't rely exclusively upon topical means in treating affections of the nose. Tonics are always indicated when the general system is at fault.

Don't expect to cure nasal catarrh in an habitual smoker.

THE RELATIVE IMPORTANCE OF VARIOUS AFFECTIONS IN THE PROMOTION OF IMPAIRED VISION.

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DALLAS.

It was my original purpose to prepare for this body a systematic consideration of the relative importance of various affections in the production of impaired vision. And with this end in view I have endeavored to go beyond the limits of my own personal experience and observation for records relating to this important subject. But I confess I have been unable to secure in the brief period allotted for this purpose all the data necessary for a complete statement of the situation. So I shall give you at the present time only a general survey of the field, with special reference to the state of Texas.

I am disposed to the belief that the records of blind asylums in Texas and elsewhere would show that ophthalmia neonatorum is the most important factor in the production of blindness. But as I have a separate paper on this disease, I shall not give it more than a cursory notice in this connection. But I will say that examinations of inmates of blind asylums can not be taken as a safe guide in the determination of the causes of impaired vision, except with regard to cases in which the vision is very much reduced, because it is only this class of patients that we find in such institutions. And while I would give to ophthalmia neonatorum the first place among diseases causing complete blindness, I would without hesitation give to trachoma the first place in the production of the lower grades of diminished vision. And while infantile blenorrhœa is a very grave affection and gives rise to a very large expenditure of

money on the part of the state for the support of its victims, I am confident that trachoma levies a very much heavier tax upon our people, by enforcing the condition of being a comparatively unproductive citizen in a vastly larger proportion of cases. Moreover, trachoma seems to be a disease especially prominent in this state. I have nowhere discovered in the clinics of this country or of Europe such a large proportion of eyes affected with grave granular conjunctivities as I find in private practice in this state of Texas. Another feature of the disease is that it is so frequently found among the agricultural people living in sparsely settled districts, as compared with those living in cities and towns, a condition at variance with the idea that it prevails to a much greater extent in the thickly populated communities. Again, the disease seems to be of a more severe type than in the eastern cities of the United States and in Europe. This is evident from the degree of corneal, iritic and lenticular complications, and also from the extensive involvement of the tarsal cartilages leading ultimately to entropion, ectropion trichiosis and other modifications of the accessory parts of the eye. In the clinics of London and Paris, for example, we find at least ten times as many cases requiring cataract extraction as we do of cases requiring lid operations on account of deformity due to the results of trachoma. And in Texas the lid operations far outnumber those for cataract. This is due in part to the extreme frequency and severity of granular conjunctivities in Texas, and in part to the limited number of cataract cases. This latter, I take it, is due in great measure to the fact that cataract is largely a senile affection, and Texas is peopled with the young rather than the old. Secondary affections of the cornea are exceedingly frequent, owing to the prevalence of grave conjunctival troubles. And I have seen repeatedly groups of cases of corneal ulceration in which there resulted speedy perforation of the cornea without pain, and before the patients apprehended sufficient danger to seek medical assistance. These cases have frequently been associated with trachoma, but the lid affection was not in proportion

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exceedingly common, and hypermetropia, either simple or combined with astigmatism, is by far the most frequent form. Muscular insufficiency, ocular neurasthenia and toxic amblyopias are probably increasing with our advancing civilization.

Offering a most humble apology for the very imperfect manner in which I have presented this important subject, I request a full discussion by those who are interested in the theme.

REPORT OF A CASE IN COUNTER EVIDENCE TO THE INFECTIOUS THEORY OF SYMPATHETIC OPHTHALMIA.

H. L. HILGARTNER, M. D.,

AUSTIN.

MR. PRESIDENT AND GENTLEMEN—In spite of the numerous observations and experiments on the subject, we are today far from clear as to the pathogenesis of sympathetic ophthalmia. There was a time when this problem seemed solved beyond a doubt by Deutschmann's investigations, but during the past few years his theory has met with so many objections in Germany, France, England and America, that a doubt as to the value of his results can no longer be overcome.

Nearly fifty years ago William MacKenzie summed up his conception of sympathetic ophthalmia in the following words: (1) "I think the chief medium through which sympathetic ophthalmitis is excited is the union of the optic nerves." This theory found most general acceptance among ophthalmologists, until the appearance of Heinrich Muller's investigations fifteen years later. Muller (2) endeavored to find the channel of communication in the ciliary nerves. His conclusions were drawn from the anatomical examination of three eyes which had been enucleated through fear of sympathetic disease in the fellow eye. While conceding the possibility of inflammatory transmission along the optic nerves, "the iridochoroiditis of the first eye," he says, has progressed so far that advanced atrophy of the optic nerve is present. The nerve is nothing more than a fibrous cord, incapable longer of conducting an irritation, or indeed any other pro-

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1. MacKenzie, Diseases of the Eye, 4th edition, p. 597, 1885.
2. Greef's Archives fur Ophthalmologu, iv., S. 367-370.

cess, so that simply cutting through the optic nerve will not lessen the chances of sympathetic trouble. The ciliary nerves, on the other hand, do not easily atrophy. The majority of eye diseases attack the anterior half of the eye, and consequently the ciliary nerves, from their position, would be more exposed to irritation. And when the inflammation of the second eye makes its appearance under the garb of irido-choroditis as it frequently does, it is far more logical for us to assume that the inflammation was brought about through the ciliary nerves than through the optic nerve. It is not improbable that the ciliary nerves exercise some direct influence upon the nutrition of the retina and optic nerve."

Muller's ciliary nerve theory seems to me to find confirmation in the following case in my own experience:

In September, 1894, Wm. McD., aet. 14, came to the Blind Institute at Austin, Texas, with the following history: Twelve years ago he stuck a knife blade into his left eye, causing loss of sight in the wounded organ within three days. From the time of the infliction of the injury until the patient came under my notice he suffered intervals of pain from the injured eye, which were attended by sensitiveness in the fellow eye. Examination disclosed that the left ball was very much shrunken, besides being abnormally sensitive to light and touch. A cicatrix was found extending from the sclero-corneal junction to the center of the cornea. Upon first examination I noticed that patient lowered his head continually to avoid as far as possible exposure to light, complaining at the same time of pain in the unhurt eye. Upon close examination faint ciliary injection was discovered in the latter organ. The patient was advised to have the left eye removed, and on the following day the operation was performed. The stump being removed and examined, revealed a calcareous condition of the interior, including everything within the sclerotic coat. The right eye was promptly treated with atrophia, and patient remained in dark room for several days, the treatment being continued until all apparent inflammation had subsided and recovery seemed secured. Two weeks later the patient attempted to read, with the result that on the day after the pain in the eye returned, and upon examination, ciliary injection was again disclosed. The pupil was very much contracted and did not respond to light. The treatment formerly pursued was repeated with the addition of hot fomentation, and after ten days recovery seemed complete; the atropia being continued, however, for one

week thereafter. During the second attack in the good eye, the empty socket was carefully examined and revealed no cause for the irritation in the fellow organ. Between four and five weeks after atropia had been discontinued the patient again attempted to read, with the same result, except that the new attack was far more tedious and stubborn than the preceding one, although it yielded to treatment after two weeks. The patient continued comfortable for one month after the ciliary muscle regained its power, when, though cautioned not to attempt as yet to use the eye, the injunction was disobeyed with a result far more serious than before, and for a time seemingly hopeless of remedial treatment. After the subsidence of inflammation, realizing the danger of any similar indiscretion on the part of the patient, the eye was kept continually under the influence of atropia for two months. After the lapse of several months since the recovery of ciliary action, the eye now seems to be entirely normal. Before the removal of the diseased eye, sympathetic irritation had begun in the ciliary nerves, as evidenced by the repeated inflammatory symptoms following ciliary action of the right eye. It seems, therefore, evident from the subsequent history of the case that the enucleation of the diseased eye was not adequate to the removal of all irritation in the ciliary nerves, for that irritation manifested itself with continually increasing violence on repeated subsequent excitations. It seems clear that the diseased condition of the nerves remained dormant for a while, and so far from manifesting a tendency toward abatement, only awaited the occasion for its development.

The counter theory of Deutschmann and his school would explain the case above cited on the hypothesis of parasitic infection.

The reasonableness of this theory of an infectious origin for sympathetic ophthalmia no doubt accounts for its acceptance; yet this theory owes almost its entire support to a few experiments with pus organisms. Now, it is well known that the pus organism does not produce sympathetic ophthalmia, as is proven in panopthalmitis, when these organisms, though most abundant, do not as a rule give rise to sympathetic ophthalmia. Deutschman's views depend upon the bacteriological examination of seventeen eyes, which had caused sympathetic ophthalmia, and in every case, save one, organisms were found, and as regards this (one) negative result, he says: (1) "It proves that no

(1) Knapp's Archives, Vol. 22, page 303, 1893.

organisms were found in my sections, and does not prove that there were no organisms anywhere present in the eye ball." In the majority of cases these micro-organisms were found also in the optic nerve and its sheaths.

Wangemann demonstrates the presence of organisms in two eyes which had given rise to sympathetic ophthalmia.

Deutschmann's work has been repeated by Alt, Gifford, Mazza, Randolph, Ulrich, Limbourg, Levy and Richard Greef, but every one got only negative results.

Richard Greef says: (1) "A systematic examination was gone through in five cases where sympathetic ophthalmia had developed, and notwithstanding the most careful bacteriological examinations according to the various methods, no organisms were found." Similar results are reported by Nordenson, Ayres, Alt, Berry, Schmidt-Ruupler, Trousseau, Poncet and Uhltoff.

Deutschmann rarely failed to find organisms in an eye enucleated to avoid sympathetic trouble. (2) Randolph examined no less than a score of such eyes, and succeeded in detecting organisms in but one case, and that was when the injury dated only two weeks back; a fact which seems to warrant the conclusion that the very questionable agency of micro-organisms in the production of sympathetic ophthalmia is rendered more unlikely when the sympathetic disturbance makes its appearance from two to six months after the injury.

(3) Ohlmann records thirty eyes enucleated to avoid sympathetic trouble, and in not a single one did he find organisms.

Cases in which a considerable period elapsed between the injury and the outbreak of the sympathetic inflammation can hardly be accounted for on this theory, for the micro-organisms in the optic nerve of the injured eye would have perished long before the appearance of the disease in the injured eye. (4)

(1) Knapp's Archives of Ophthalmia, Vol. 22, page 302, 1893.
(2) Knapp's Archives, Vol. 21. page 373.
(3) Archives f. Augen, Bd. 22, 1.
(4) Knapp's Archives, Vol. 22, page 303.

Richard Greef examined the ends of optic nerves in fourteen cases where neurectomy was made for fear of sympathetic disease, and in not a single instance did he find organisms, either in the optic nerve or its sheath.

Innumerable other investigations might be adduced, which, like the above, fail entirely to verify the conclusions of Deutschmann, and point rather to the positive conclusion that the micro-organism is in the majority of cases not present as an exciting cause.

Collecting the results of our investigation, it would seem clear from the case above cited that the lapse of twelve years between the injury and the outbreak of the sympathetic trouble in the other eye must have annihilated any micro-organic agency as a factor in the case. Such a period of time far transcends any scientifically established term of life for such organisms, nor does it seem possible that their operation would have remained for so long a time in abeyance, even on the assumption of their presence in the system.

In conclusion, it seems most probable that the pathological symptoms in the uninjured eye resulted from a purely mechanical irritation, propagated from the diseased organ before its removal, and asserting itself after that removal with steadily increasing violence until rest and treatment restored the normal state.

THE CARE AND PRESERVATION OF THE EYES.

FRANK D. BOYD, M. D.,

SAN ANTONIO.

The care and preservation of the eyes should be looked after before the birth of the child. The mother should be careful with herself; see that she is in the very best condition possible before and during the time of gestation. In fact both parents should see that they are in the best state of health possible before bringing children into this world. Surely we should be more careful as to our own offspring than we are to our stock, but alas! it seems as a rule we are not. We are too careless, I am sorry to say.

One of the most common (I believe) causes of blindness today is due to a careless handling of the child at birth. It is certainly a well known fact that all mothers have more or less a vaginal discharge. That a large per cent is very infectious there is no doubt. So often we are called to the bedside to see an infant that has "sore eyes," and on opening them we find at once a typical case of ophthalmia neonatorum, or sore eyes, in infancy, caused nine times out of ten from carelessness on the part of the midwife, nurse, or sometimes, I am sorry to say, the physician. If you inspect this discharge you will notice at once the similarity to that of the mother. It is such an irritant, that it soon not only destroys the lining of the eye lids, but invades the cornea, and if not very careful we have the utter destruction of the tissues, and a dense opaque cornea is the result. I am positive from statistics that have been published, that a great per cent of blindness in our blind asylums is due to this terrible disease. How very important it is that every physician should realize the danger the eyes are in with every case of child birth. How

careful they should be to impress upon the mind of the mother the danger, and learn her to cleanse the parts thoroughly if she has the slightest leucorrhœa, and if not, keep the parts thoroughly clean. I would advise the use of bichloride solution 1 to 5000, and syringe parts thoroughly.

After the child is born the eyes should be examined at once, and a wash of the Sat. Sol. Boric Acid used two or three times daily for one week at least, even if there were no signs of inflammation. We can't impress upon our minds too much the great necessity of prophylaxis in new born infants, and by way of parenthesis I should say we can't impress upon our minds too much the necessity of prophylaxis in all branches of our profession.

The eyes should be guarded from the bright lights up to the age of six months at least. They should have plenty of fresh outdoor air, but avoid the dust and irritants, for at that age the eyes are very susceptible to any exposure. In this age parents tax the eyes of a child too young. They are sent to school too soon, and long lessons are given them that compels them to strain the muscles that control the accommodation of the eyes for class work, and the final result is weak eyes. Parents are so ambitious for their offspring that they encourage them to use their eyes until late at night, and very often by dim lights and all that tends to a general giving away of the accommodation of the eyes. Now, all this is a very serious mistake. Kindergarten teaching is very good, but the eyes while young should not be confined to close work for any length of time; should change from one object to another, as that rests them. The continual use of the eyes at close work always lead to some trouble if not very careful. They are compelled to stop school, consult some oculist, and the result is complete rest or glasses prescribed. We often find myopia, hypermetropia, some form of astigmatism or insufficiency of the muscles. Bad lighted school rooms, too, are a potent factor in the cause of eye strain. The intense glare of the rays of light falling directly in front of the eyes causing a powerful contraction of the muscles, and by this

contraction there is caused an elongated eye ball, and, of course, myopia (nearsightedness) is the result.

Badly printed books used to be a great factor in the cause of eye strain, but of late years the print is much better.

Architects should always be reminded that in the construction of school buildings the windows should be placed in such a manner that the light will be thrown such a way that the rays fall over the left shoulder and not cause a shadow over the book or paper. In most of our public schools we see the windows are opposite each other which causes a cross light, and that is very injurious.

Among business men who are kept continually over their books, we find a great amount of eye trouble. The bank clerk, typewriter, and in fact among all who lead a sedentary life, all have more or less eye trouble. We now find a great many offices in our cities using electric lights. They recognize the brilliancy of the light, and think it good, but not true. The rays are too severe and not soft enough. They make a very brilliant and pretty light, but to my mind the gas is much better, as the rays are more diffuse and softer to the eye. The very best artificial light is the student lamp. Another great cause of eye strain is reading in any conveyance while in motion. I have so often seen men and women board a train and at once begin reading, often especially while in a street car to or from business, read until their destination is reached, with head bobbing all the time, and on observing them closely they begin rubbing their eyes, and wonder, no doubt, what could be the matter with their eyes. They consult some oculist and declare they can't imagine what could be the matter. The oculist can hardly convince them that over use of the eyes, straining the ciliary muscles till finally they loose their power, and the result is complete rest is prescribed or glasses to rest them.

This paper could be prolonged many pages more, but I shall not impose longer on the time. I have thrown out these facts among many others that could be given as to the necessity of the care and preservation of the eyes.

OTITIS MEDIA.

W. T. COLE, M. D.,

WACO.

Otitis media is an inflammation of the lining membrane of the middle ear, and is variously classified by different authors, but for all practical purposes it may be divided into the acute and chronic forms of catarrhal and purulent otitis media. The catarrhal form is merely an extension of catarrh from the naso-pharynx via the eustachian tube. Being but slightly inflammatory, it is usually insidious in its attacks, coming on without notice and progressing from the acute to the chronic form, or from the moist to the dry form. And though it rarely produces total deafness, yet it probably causes more defective hearing than all other ear troubles combined.

All other forms of otitis media are doubtless due to microbes, and probably ninety-five per cent are introduced by the eustachian tube from the naso-pharynx. Zaufal, Moos, Weichselbaum and others have proven pretty conclusively that all cases of inflammatory diseases of the middle ear are due to bacteria of one kind or another. The diplococcus of pneumonia were found by Frankel and Weichselbaum, and the streptococcus pyogenes were found most frequent by Zaufal. The germs of la grippe at the present time possibly causes one-half of all serious inflammations of the middle ear. Otitis media follows as a sequel to acute or chronic nasal catarrh, scarlatina, measles, variola, typhus, pneumonia, pharyngitis, laryngitis, tuberculosis, perperal fever, influenza, etc. Bathing and nasal douches are both fruitful ways for carrying germs directly to the middle ear. The middle ear might be compared to a house with one door, which is always locked, and with only a sewer pipe to

connect it with the outer world. The drum is the locked door, and the eustachian tube carries off the waste material and gives ventilation. The great wonder to us is that so little infection occurs.

Symptoms: Except in the catarrhal form referred to, the disease commences, as a rule, with lancinating pains in the ear, which may extend to the top of the head, to the neck, or to the teeth, or the onset may come on with a sense of stopping up or stuffiness of the ears. Occasionally there may be subjective symptoms, noises, roaring, whistling, puffing, etc. Acute purulent inflammation is often accompanied by fever. The objective symptoms upon which we should rely mostly for a line of treatment is obtained by inspection of the drum and external meatus. The color of the normal drum is glistening and pearly, like the inside of a fresh oyster shell, and any deviation from this indicates some pathological condition. The shape is concave outward. In catarrhal otitis media it loses its pearly lustre, becoming of a white, or dull ash color. The appearance of the drum is the index to the condition within the tympanic cavity. The faintest blush around the periphery or along the malleus indicates some inflammation. The only differential diagnosis would be some rare myringitis. In otitis media we may find upon the drum blebs, blisters or sacs, or if the case is late coming to us there may be perforations before the case is presented with escape of fluids, or if tension is great the drum is seen to bulge outward instead of its usual concave appearance.

In a series of sixty cases treated by me recently, in which thirty-three were acute and twenty-seven chronic, I have selected a few typical ones to illustrate etiology, treatment, etc.:

CASE I.—Mr. S., age 35, came to me suffering with disagreeable, if not painful, pressure in both ears, with noises, hearing diminished one-third; bone conduction above normal. Drums were retracted. Patient was suffering with hypertrophic catarrh, and tubes were closed. I diagnosed this case as one of catarrh of the middle ear. I cleansed the nose with spray and inflated, using catheter on left. With treatment and improvement of nasal catarrh, with inflations patient grad-

ually improved, till final recovery. This form of otitis media I believe to be the only form in which inflations are of any use. In these cases the tubes are closed by mucous or conjestion; the air is exhausted from the tympanic cavity. As far as medication through the tube is concerned, I have not a particle of faith in it.

II.—Mrs. W., a matron of about 32, robust, had been treating a nasal catarrh by means of some form of a patent douche, which doubtless washed some form of infective germs, possibly streptococcus pyogenes, into the middle ear, setting up a violent otitis media of the left ear. After two days of agony and loss of sleep, she came to me for relief. I found the external meatus plugged up with debris of all kinds, for friends with the aid of the family physician had poured into the external meatus almost everything imaginable, laudanum, glycerine, morphia, cocaine, vaseline, onion juice, etc. From intense suffering the patient was as nervous as a patient with tremens, so that I had great trouble in cleansing the ear to see the drum, which I found almost ready to break down. I made a perforation when a muco-purulent exudation, with sanguinous stain, made its escape. I cleansed with peroxide of hydrogen, followed with solution of bichloride 1 to 3000, with tartaric acid, a teaspoonful to a quart of water. Patient fell asleep before I finished the dressing. With some antiseptic treatment once a day, the patient recovered in about a week. I have stated this case to illustrate the manner of infection. I have traced five cases in my practice to the use of nasal douche, that quack instrument. This method of infection was described by Roosa several years since, and has been abundantly verified.

CASE III.—Lady, aet. 30. Seized with excruciating pains in both ears, radiating to neck and teeth. Came to see me on second day. Had not eaten or slept during the attack; suffered with nausea and vomiting. Found both drums highly inflamed and bulging considerably. Did paracentesis on both drums, giving relief from pain, but nausea continued with some fever for two days, when earache again developed, due to closure of perforation. Reperforated drums, when case went on to recovery. It developed in this case that the lady had been a few days previous to this attack bathing in the natatorium pool, and was badly strangled. From this I account the otitis media. I wish to make a point here that I believe has not been previously made, viz: that all cases of ear trouble due to bathing is caused by strangulation, forcing infection by way of the tubes, and not by the external ear, as has been commonly supposed. I have been able in most cases to find some history of strangulation. The old theory that bathing caused ear troubles by macerating the drums is not tenable. If it were true that water in the ear macerates the drums, we

should all be deaf, for every civilized person gets more or less water in the external ear every day. When strangulation occurs the water is driven with explosive force into the naso-pharynx and thence into the middle ear via the tubes. Another point, the nausea and fever indicated involvement of the labrynth or internal ear.

CASE IV.—Young lady, age 18. Taken with a severe type of influenza about March 20th. Soon after developed trouble in both ears, suffering intensely for three or four days, when both drums broke. I was called in first to see the patient on the 29th of March, and found her suffering from pain in the region of the left ear. Pain extending to vertex, neck and face. Syringed out ear with peroxide of hydrogen and other antiseptics, drawing out the pus by means of otoscope. I also scarified in front of the tragus and applied blister over the mastoid. The patient had fever 102°, for which I gave phenacetine, ten grains every three hours. On the 1st of April last symptoms of mastoid involvement were unmistakable, and I operated at once. The skin being infiltrated and inflamed very much over the mastoid region. On opening of which I found the bone perforated in the usual place for perforation, about one centimeter back of the external meatus. Curretted out the diseased bone and washed out with peroxide of hydrogen and applied gauze dressing. I dressed the wound once every day with an antiseptic solution. I found no pus after the first dressing. The patient has entirely recovered except the external wound, which is kept open by means of a gauze tent till granulation can fill in the bone space. This case is a type of frequent occurrence as a sequel to influenza. The point I would make in this case is that if I had been called in when her ear trouble first developed, I might have saved much suffering, and have prevented mastoid involvement.

The chronic forms of otitis media is but an extension or continuation of the acute forms. Dry catarrh naturally follows the acute hypertrophic form, and chronic purulent otitis media is but a prolongation of the acute form of septic. I have little faith in anything but operative treatment for chronic catarrh or for the middle ear. As I have already stated no medication can possibly reach the middle ear, except by way of external meatus, and Sexton's operation is about the only operation which will give us anything except a temporary opening. There are various operations available for the purulent form of otitis media. Except where the attic or antrum is affected, Sexton's operation is most available. Stack's operation is very good for attic, and a

mastoid perforation is good for the antrum. I have done various operations, but will only take the liberty to report one of several of Sexton's operation:

A young lady about thirty, good health, had been afflicted from childhood with repeated risings in both ears; for several years had been made miserable by reason of tinitus aurrium. Hearing in right ear about two-thirds normal, left ear heard conversation two feet; bone conduction good in both ears. I did Sexton's operation on the left ear, removing drum and ossicles successfully, found naked bone over great part of promintory of the labrynth. Noises were painful for some time after the operation. Within a month after the operation patient could hear conversation ten feet, and tinitus had nearly ceased. Have had to remove granulations from tympanic cavity on two occasions. Drum has not been renewed.

I should like to report other cases, some of which have not given such good results.

I desire to call the attention of the association to an invention of mine which I have designated a tympanotome. A rude drawing will show its design. I regret that I have not an instrument with me. Tiemann of New York shipped the first complete instrument to me on Monday, but for some reason it has not yet arrived. This invention was mothered by necessity. In my practice I was convinced that paracentesis would often, if made in time, prevent great complications by preventing extension of inflammation to other parts connected with the middle ear. It is often impossible to make a satisfactory opening through the drum with the usual knife or paracentesis needle, and even if you succeed in doing it, the perforation may close up within twenty-four hours, besides the operation as now performed can scarcely be done without wounding some other part of the ear.

My instrument works automatically, so to speak. It is absolutely safe and can be used by any general practitioner without fear of doing unnecessary damage. It makes an arc shape perforation, giving free egress to pent up exudation and ingress for medicines.

OTITIS MEDIA.

R. H. CHILTON, M. D.,

DALLAS.

In presenting to your consideration the subject of middle ear inflammation, it is necessary to refer first to the anatomy of the part involved.

Middle ear disease properly includes the tympanum, eustachian tube and the mastoid region (antrum and cells). This cavity contains many points of anatomical interest which are always to be considered in its treatment. The parts relating to sound perception are the membrana tympani and the ossicles. The most important of these is the stapes. Its destruction necessarily involves the oval window and cuts off connection between the internal ear and the sound waves entering the external auditory canal. The other parts of interest are the eustachian tube by which the drum head is inflated, and the mastoid. The latter is of most interest when considered from another standpoint than that of hearing. Its proximity to the brain and the extension of inflammatory disease to same is of more practical interest than its relation to sound. Acute middle ear troubles are to be distinguished from acute myningitis and other painful diseases of the external ear; the former only requiring particular care. The distinction is easily made by the appearance of the drum, its position being unchanged. The external canal is generally more or less involved, and the hearing less affected than in acute middle ear disease.

The cause of middle ear inflammation are various, but to my observation it is usually from an extension of inflammation from the naso-pharynx, or to the flooding of the middle ear by sea bathing or diving, and by the nasal douche. The cases coming

under my observation oftenest are those suffering from chronic colds, and generally have adenoid growths, enlarged tonsils and hypertrophic rhinitis. The proper care of these cases and prevention of the disease under consideration is of much interest. Outdoor life is of first importance. Bathing the face, neck and chest daily with cold water is advised, but above all, the early removal of enlarged tonsils, adenoids, and hypertrophic disease of the nose is the only sure preventive. The question here arises as to how early these abnormal growths should be removed, and when to begin the treatment of rhinitis. These troubles, like all others, are best treated in their incipiency. No child is too young, and better results are obtained not only in early life, but early in the course of the disease. Purulent middle ear inflammation differs from the simple or catarrhal form in being more severe, and also in its causation. The latter is likely due to micro-organisms, and may usually be found in eruptive diseases and continued fevers, as well as intermittent fevers. It is also different in duration and final result. The catarrhal form seldom invades the mastoid region, and its tendency is to perfect recovery, even when perforation of the tympanic membrane occurs.

The treatment of severe cases of catarrhal inflammation and purulent inflammation of the acute variety is very much the same. Perfect rest in bed, with mild cathartics, combined with gentle, hot douches for the relief of pain, is often sufficient. Often it is necessary to abstract blood by leeches, and this should be done early in order to derive the full benefits from its use, and to avoid suppuration and perforation. This is always beneficial. Atropia dropped in the ear is sometimes of use. Gentle politzerisation by which the tympanum is emptied, is of great importance. Should the pain persist, and bulging of the membrane shows fluid in the tympanum, you should by all means make a paracentesis and *do it early*, following paracentesis or perforation with a mild antiseptic, especially if pus be present. In these cases strong styptics and caustics should never be used. Extreme cleanliness is of great value, and the METHOD of doing this is very important. The much vaunted peroxide of hydrogen, unless

properly used, is a delusion. Unless used in cases where pus is present it is valueless, and if *improperly* used in *these* cases, it does harm. No one should ever use it (when pus is present) without afterward using water with a syringe or cotton swab to remove clotted particles nearly always left by the action of the peroxide. No treatment of any kind should ever be applied except by artificial light in the ear. The object of any treatment is not to stop the discharge, but to remove the cause. My opinion is that the discharge in the acute stage should be encouraged for two or three days following immediately a perforation or paracentesis. But it is well to remember that the discharge must cease before the ear heals. Politzerisation should be resorted to daily after discharge begins.

It is not well to instill fluids in the ear too often. Bad treatment is worse than none. Following the discharge you can soon begin the use of mild disinfecting powders, of which boric acid is the best, because of its solubility. No powder should ever be blown in the ear when the ear has not been properly cleansed. Iodoform is invaluable in some stubborn cases. None of these remedies should be used except by the physician. The method of application is a most important matter. First, you should see that the opening in the drum is well cleared, so as to allow either fluid or powder to reach the middle ear. A fluid should be applied with patient inclining head to opposite side, then with gentle pressure on the tragus closing external canal, the fluid is forced through. When a powder is used, only a small quantity blown in the opening in the drum is admissible. Never pack the ear so as to prevent discharge. The latter is worse than no medication. Unless you can see the parts involved, it is doubtful whether any treatment is advisable other than medicine to relieve pain, and an occasional cleansing with either sterilized water, or water containing a mild antiseptic. Mild solutions of mercury bichloride, or listerine, are good.

The relation which the middle ear holds to important parts of the cranium and face makes any disease in this locality of especial interest, not only as regards the hearing, but life also. The

proximity of the facial canal and sinuses in this region makes any middle ear disease serious, especially when purulent. The time to cure these cases is in the beginning, especially when purulent. A person, old or young, with hypertrophic tonsils and turbinated bones or adenoids, should never be allowed to go without treatment. Chronic otitis, unless sub-acute, is nearly invariably of the purulent variety.

What has been said in many instances in regard to the acute variety need not be repeated here. Some author has said "that if acute otitis was properly treated we need have no chronic cases to treat." While there are exceptions to this statement, it is practically true. The exceptions are found in tubercular cases, and a few others suffering from debilitating disease and long continued fevers. This being the fact, how great is every physicians' responsibility who allows an acute case to become chronic, thus jeopardizing the happiness and life of the individual suffering. This disease is the result of two things, neglect and bad treatment. If the former, the physician is not to blame; if the latter, it is but just for him to suffer, for it is his duty to be prepared to treat the disease intelligently.

The presence of pus in any chronic disease of the ear presupposes middle ear disease. The object of any treatment is to stop this discharge. No treatment should be applied except under good illumination. Should polypoid growths be present, remove them. The ear should be cleansed daily with a disinfecting fluid, after which the application of antiseptics (applied only to the affected part) should be used. Of these the powders are preferable. Alcohol, either pure or diluted, is of great value. Chromic acid is sometimes useful when granulations are present, but should be used carefully, and any excess, neutralized at once. A few weeks of daily cleansing and careful treatment is sufficient to cure many of the cases, unless necrosis of the inner wall of the tympanum malleus or other ossicles exist. If these are found nothing but excision of the drum and the necrosed part will suffice. The safety of the patient's life demands this. How much easier to cure the disease in the acute stage. The

most important thing I shall call your attention to is the result of acute and chronic otitis, the latter especially.

There is no estimating the lives lost by the extension of this disease to the brain. We know of many, but how many more are carried off by an extension of this trouble during acute attacks of other diseases. How often have you seen your patient die without expecting it? Had you investigated the previous history you would have found a long standing middle ear suppuration which extended to the meningeal membranes. Mastoid disease is always serious, and very common middle ear disease, especially when the attic is involved, which nearly always occurs in long standing cases. In fact, it is wonderful that the mastoid is not always involved, when we consider its anatomical relation to the attic portion of the middle ear. However, the reduplication of mucous membrane near the mastoid aditus is a barrier; yet once beyond *this*, the aditus, antrum and cells are involved; then, without serious surgical interference, it is doubtful if it ever recovers perfectly, if at all.

Middle ear disease is a constant menace to other organs, and involves more of interest to us than all the other organs of special sense. Patients suffering from middle ear suppuration are at all times in danger of septic poisoning from retained pus; especially is this true if the perforation be small and the drainage imperfect, which prevents the pus from escaping. Sinus thrombosis is another source of danger; the temporal bone has at least four sinuses. Any discharge of pus indicates serious disease involving more vital structure than are found elsewhere in the human body. You should seek the source of suppuration, and if not controlled by treatment such as I have referred to, operative interference is demanded. If the disease develops in childhood, then that is the best time for treatment or an operation, for success is far greater in the treatment of the young. Middle ear disease, either acute or chronic, is far more fatal in adult life.

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:ITHALMIA NEONATORUM, WITH SUGGESTIONS OF NEEDED LEGISLATION.

EDWARD PAXTON DAVIS, M. D.

HOUSTON.

(GENTLEMEN—"Avoid a poultice!" This is my first injunc-.on upon approaching you and the subject which I will ask our indulgence in discussing. I beg to thank you and espe-ially my friend, Dr. Moss, chairman on ophthalmology, for this privilege, and I have selected a subject, "Ophthalmia Neona-'orum," that is of equal interest to the general practitioner and to the oculist; indeed, it is the general practitioner who first sees them, and from him that we usually receive these cases.

All our text books agree that ophthalmia neonatorum is iden-tical with that of gonorrhœal ophthalmia in every respect, ex-cept that it is milder in type. Juler, in his last edition, says: "Purulent conjunctivitis is an acute suppurative inflammation of the conjunctiva, which is produced by inoculation with gonor-rhœal virus, and whose copious purulent secretion can likewise produce inoculation." "For convenience of description and treatment," he says, "it is divided into two classes, gonorrhœal ophthalmia and ophthalmia neonatorum."

The complications liable to accompany gonorrhœal ophthal-mia are inflammation, ulceration and sloughing of cornea, iritis and panophthalmitis.

The only cause of this terrible disease is infection from geni-tals or from a similarly affected eye, either of the patient or of another person. The poison may be conveyed by the finger, by pocket handkerchiefs, by towels or in other ways. Juler empha-es the fact that ophthalmia neonatorum or purulent conjunc-tis occurring in the new-born is identical with that just

described as gonorrhœal, to impress the necessity for promptness if prophylaxis fails. In passage of the child's head through the vagina, the eyelids become smeared with vaginal and urethral secretion, and as soon as the eyes are open they can easily become inoculated, or supposing the discharge to be free from gonorrhœal poison, it is equally possible for an acute catarrhal conjunctivitis to be set up in the same way.

It is remarkable that a very slight and long standing gonorrhœal discharge will set up a very acute ophthalmia, either in the eyes of the newly-born or in those of adults, when by carelessness or accident it finds its way into a healthy eye. Ophthalmia neonatorum usually declares itself on second or third, rarely on the fourth or fifth, day. Should it come on a later date, it can no longer be attributed to the birth, but some other means of inoculation must have been in operation.

The symptoms and complications are essentially the same as those occurring in gonorrhœal ophthalmia, except that they are somewhat less pronounced in degree—the pus is less copious, and the ocular conjunctiva is not so much affected, as shown by the absence of any extensive chemosis. The cornea is less liable to inflammation, abscess and ulceration, in this than in gonorrhœal ophthalmia. If ulcers do appear, as they frequently do in neglected cases, they are less rapid and destructive in their course. By Credé's method of prophylaxis, ninety-nine per cent of new-born would escape this terrible disease, and with prompt, intelligent treatment from time the first symptoms or redness and inflammation make their appearance, almost every case will result in perfect recovery.

Carter, of London, in 1876 said: "I can not too strongly express my conviction that no infant should ever lose its sight from this affection, and that sight can not be lost under the observation of a medical man except as a consequence of neglect or want of knowledge of a very flagrant character." This is putting it very strong, but serves certainly to impress upon the doctor the responsibility involved and the criticism the loss of an eye would cause. But Dr. Carter says: "If ophthalmia

neonatorum is neglected or improperly treated it may soon implicate the cornea, and then become a source of exceeding peril to sight, and I may say that it is supposed to cause nearly one-half the existing blindness among the children of London and throughout England, although with care the disease ought to terminate in perfect recovery in every case."

Very often, of course, medical advice is not sought till the time for treatment has passed. Physicians, as well as midwives, are sometimes to blame, for in every instance the accoucheur should warn the mother and attending nurse to send for him without delay on the first appearance of redness, swelling or discharge from infant's eyes, and specific direction should be given by doctor as to proper way of applying remedies and washes prescribed, for these are often poured over the face or clothes, indeed anywhere but in the eyes.

Fuchs says: "This disease is identical with purulent ophthalmia of adults. Moreover, it owes its origin to infection by secretion from genitals, which are affected with virulent catarrh, and occurs, as a rule, during parturition. The eyes show the infection usually in two or three days after birth. The symptoms of the disease are the same as in the blenorrhœa of adults, except that they are less severe, for even when there is great swelling of lid and very profuse purulent discharge, the part which the bulb or conjunctiva takes in the process is relatively small, and we rarely find great chemosis. Hence, also, the danger of suppuration of the cornea is not so great. It does indeed occur, and that often enough, too, but only in those cases which are treated badly or not at all. If a case comes under treatment in season, that is, while the cornea is still intact, the cornea can almost surely be maintained in a healthy state and the danger avoided."

Again, I wish to call your attention to the ignorance and to the criminal negligence of midwives and nurses, and the necessity of special instruction to all those entrusted with the care of infants, who so often when it is too late to avoid the dangers that attend this disease, come with their burden to ask the doc-

tor to take charge of and assume the responsibility and odium of their neglected charge; often you get these little sufferers when the cornea is ulcerating and more or less opaque, sometimes even with one or both eyes blind and staphylomatous. I have had three such cases within a year, from remote parts of the country, one that had both eyes poulticed out, and two others with one staphyloma, each as a monument to criminal ignorance and neglect. A fourth case was the child of an M. D., who brought a six-weeks infant with both cornea denuded of epithelium and milky white, though the father assured me he had been assisted in treatment by an excellent physician; we succeeded in preserving and restoring both of these eyes to useful vision after long course of treatment; one eye is almost normal, the other has a slight leucoma covering part of pupillary space, though I think it will be entirely gotten rid of in time. There is no doubt in my mind but in this last case the proper remedies had been used, but not properly used, and our text books are somewhat to blame, because they do not go far enough into details as to *how* the applications should be made, and *why*, hence my excuse for going into minutiæ, even in the matter of washing and cleansing the eyes, and to impress again the fact that a poultice has no place in the treatment of these cases under any circumstances.

I want to impress upon you that the treatment in first stage consists in absolute cleanliness and applying cold compress 1-5000 bi-chloride solution continually; caustic or astringent agents are contra-indicated until the pus-secreting stage or suppuration commences. The treatment then should consist in diligent cleansing of eye with any mildly antiseptic solution; I prefer the use of solution containing ten to twenty grains boracic acid to ounce of water or solution of the bichloride 1–5000, with which the eyes are thoroughly cleansed as often as the secretion appears within the lids (at least every hour for first twenty-four or forty-eight hours.) I find it necessary to teach almost every nurse (the professional nurse not excepted) how to get the wash into the eyes, and have found the simplest and

most effective way is to have the nurse sit by an ordinary table where a teacup holding the solution to be used may be placed in easy reach; the party holding the baby sits just in front of nurse, with chair facing at right angles to that of the nurse, so that the head of the infant may be held on or between the nurse's knees, over which is thrown a large double towel to catch the overflow of water, while the other party may hold the hands and feet of the little one to aid in restraining its hilarity during this very pleasant performance. Now the nurse takes a wad of absorbent cotton (never use a rag) from the table on right hand where the cup of warm antiseptic wash also sets, and, while holding the upper lid, gently but firmly drawn up and pressed against the upper part of orbit, she dips the absorbent cotton into the solution and drips it from the desired height into the eye between the parted lids, thus thoroughly washing out all the accumulated secretion without even allowing the cotton to touch the eye. When sufficient irrigation has been effected in this way, squeeze the water out of your cotton, dry the eye and face thoroughly with it, then throw away this piece of cotton and get a new piece for second eye.

As soon as suppuration commences, we begin with the application of a solution of nitrate silver, five or ten grains per ounce, applied to the everted lids and thoroughly neutralized and washed off with solution of chloride sodium. This application should be made once a day, and by the doctor, and should be continued till the cure is complete. Where the cornea is involved, the greatest care must be exercised to prevent the nitrate of silver solution or the precipitated chloride of silver from coming in contact with the ulcerating cornea.

It is frequently necessary also to use atropia in these cases, and one grain to ounce of castor oil is a very excellent way to instill it. Iodoform, twenty grains to ounce of castor oil, is very useful, too, in corneal ulceration. Ointment of one grain yellow oxide with one ʒ vaseline will be found most excellent stimulant to the ulcerating cornea of this type as an adjunct to treatment.

During the time I was connected with the Charity Hospital, New Orleans (1885 to 1890), first as chief of clinic and then as visiting oculist to the women and children's eye department, our hospital records showed less than two per cent of the children born in the maternity wards of the institution had any inflammation of eyes, and not a single eye was lost or injured from among these, for where prophylaxis was not successful the prompt attention given upon first appearance of redness corrected the condition before it could have assumed a serious type.

During a recent visit to New Orleans, the Charity Hospital and New Orleans Eye and Ear Infirmary, my old friend and former confrere, Dr. H. B. Bruns, furnished me with the statistics of the following thirty-five cases, which demonstrate what proper treatment will do. These were from the lower class of charity patients:

First Group—10 W., 5 males and 5 females. Treatment, listerine sul. and argent, nit. X grs. to ℥. Duration of treatment from 16 to 76 days (average 30 days). All cured and no serious impairment resulted.

Second Group—29 W., 6 N., making 25 cases, of which there were 15 males and 10 females; 6 ran off after severe symptoms disappeared; 19 were treated with borax and listerine wash, together with V to X grs. arg. nit. Duration of treatment 7–52 day's average 22 days. Of these 25 cases 6 ran off and 19 cured; those of the negroes running a longer course than whites by several days.

I hope you will pardon me for entering upon details that may seem common place or unnecessary, because I may be addressing some physician who will be called upon to treat his *first* case after leaving here, and who may be interested in such detail.

The statistics which I will ask you specially to note I hope will enlist your co-operation in securing legislation in behalf of this most important, most helplessly dependent, and at the same time often the most criminally neglected individual in our land, the new-born of the poorer classes of city, town and country, whose helplessness appeals for legislative protection against ig-

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all classes of society), yet before the mother has recovered from the ordeal of giving them birth, she witnesses the light of day, and all the beauties of nature it reveals, has been shut out forever by the ignorant neglect of those entrusted with the care of her babe.

In 1887 Dr. Lucien Howe, of Buffalo, at a meeting of the American Ophthalmological Society, presented an article in regard to the increase of blindness in the United States, calling attention to the fact that according to census reports the number of blind in the United States was increasing much more rapidly than the population. This association and the State Medical Society of New York both appointed committees (of which Dr. Howe was chairman), and these societies, upon report of committees, reported the advisability of legislation to limit the further increase of what may be considered the *principal* cause of blindness, ophthalmia neonatorum, throughout the world. From report of the committee appointed by the American Ophthalmological Society, 1890, on "Causes and Prevention of Blindness," I quote:

"The population in the United States in 1870, as shown by census, was 38,558,371, and the number of blind 20,320; in 1880, population 50,155,783, and the number of blind 48,929," that is to say, while the population increased 30 per cent the blindness increased over 140 per cent.

For the purpose of inquiring into the cause of this increase, the state of New York was selected as offering particular advantages for the purpose of inquiries, and it was found the number of blind in New York state in 1870 was 2,213 and in 1880, 4,981; that is to say, while the population increased 15 9/10 per cent, blindness increased 125 7/10 per cent. Upon further inquiry as to what are the most important causes of blindness, the examination of the patients in the blind asylums and poor houses of New York state (including all ages and sexes) there were 23 per cent of the cases due to ophthalmia neonatorum.

Upon the strength of these figures the New York Legislature, largely through the influence of Dr. Lucien Howe, passed a law

in 1890 making it a felony for nurse or midwife or other person having charge of an infant to fail to notify a qualified physician at once upon the appearance of redness or inflammation of eyes, with penalty of fine and imprisonment. Second, the Legislature of Maine, through the influence of Dr. E. E. Holt, in 1891, came next with a bill known as Senate Bill No. 97, which I have read to you; third, or next, was passed by Rhode Island in January, 1892; fourth was passed by Minnesota in February, 1893, and sixth by Maryland in April, 1894.

An effort was also made by Dr. H. D. Bruns and others, of New Orleans, to have the Legislature of 1894 to pass such a bill for Louisiana, though the measure was overshadowed by political issues, but it will pass the next Legislature. Many other states are agitating the matter and will probably secure legislation before the end of 1895, and I trust that Texas may be the next, for Texas has ever been ready to join her sister states and lead them to victory against an invading enemy who threatened or attempted to rob her rising generations of possessions which were theirs, either by acquisition or God-given, and I ask you, gentlemen: "Could any cause be more just or any enemy more merciless or relenting than the present one which attacks the helpless infant and robs him of all the beauties of nature which God has so lavishly bestowed upon this fair state, and banishing him into eternal darkness that is worse than death?"

TRAUMATISM OF THE EYE.

R. H. CHILTON, M. D.,

DALLAS.

Any injury to the eye ball is of enough importance to demand careful examination and treatment. Injuries of the conjunctiva, the least harmful, are often followed by annoying troubles, sometimes being the cause of pterygia and other hyperplastic growths, which, if not (as they often are) destructive to sight, are never completely recovered from. Corneal injuries are often serious. Even superficial wounds from cinders and other foreign bodies that do not puncture the full depth of the cornea are sometimes the cause of the loss of the eye, and frequently the beginning of serious ulcerative keratitis and kerato-iritis. I saw an eye recently in my practice which was injured by the point of a dead cedar leaf entering deep into the corneal membrane, but which did not penetrate the anterior chamber. This was removed by some one, and I saw the patient after the site of the original wound was ulcerating, and the kerato-iritis had already developed. The case was finally one of hypopion-keratitis and later panophthalmitis, and enucleation was imperative. Doubtless the wound was left in a septic condition by particles of septic matter being on the leaf; and not being properly cleaned, the the micro-organism soon attacked the deeper structures, and hence the loss of the eye.

Abrasions and penetrating wounds of the cornea are of such a nature they are often overlooked, because of the transparency of the cornea. Fortunately we have in flurocine a remedy that shows up all injuries, superficial or deep, so that there is no excuse for overlooking them. All foreign bodies should be removed at once, if possible, after which the eye should be made aseptic and kept

so till the abrasion heals. Such foreign bodies as cinders and pieces of metal in the body of the cornea should be removed, if possible, by the use of a probe covered with cotton. By the use of this you avoid further abrasions of the cornea. But if not practical to do this, a spud or needle will always answer the purpose. This should be done without injury of surrounding parts, as far as possible. Injuries of the eye ball from steam, hot water, grease or caustics, are liable to involve both ocular palpebral membranes, and if not properly treated, symblephorin and ankylo-blephorin or other troubles will follow. To avoid this the wound should be dressed often and the ocular and palpebral membranes separated at each dressing.

No injured eye should ever be treated until you have thoroughly inspected the whole of the eye ball, no matter how great the swelling of the lid. Deep-seated and penetrating wounds of the cornea and sclera are always grave. Most of these wounds involve other structures vitally important to vision. If they do not involve other structures they are to be treated as simple wounds. Prolapse of the iris in penetrating wounds of the cornea or at the sclero-corneal junction, are the simplest of the complications. Often if it is removed or replaced, healing is rapid and perfect, and a fairly good eye is the result.

Injuries of the iris are nearly always of a serious nature, and are most frequently accompanied by injury of the lens also. This increases the iris trouble which follows in the iris, by the rapid swelling of the lens and the pressure on the already wounded membrane.

Traumatism in the sclero-corneal region or in the cornea, involving the iris and lens, is the most difficult to handle. Sympathetic disease oftener follows injuries in this region than in all other parts of the eye. The vision after such wounds is usually greatly impaired and of little use, and the eye is generally subject to inflammatory attacks involving finally the fellow eye. The most frequent source of trouble in any corneal wound in involving other parts is from septic matter entering the eye with the foreign body, or that which is allowed to enter from careless

handling in the treatment and from improper treatment. Washing these eyes with sterilized water, afterward carefully bandaging the eye, is better than too much or bad medication. Often this, with a mydriatic or myotic to hold the iris away from the wound, is all that is necessary. Traumatism of the iris without injury to the lens is very rare, and unless accompanied by severe traumatism of the cornea, usually subsides under a mild anodyne. In all wounds of the iris, mydriatics and anodynes are demanded, unless the accompanying corneal wound is very pepipheral. The use then of a mydriatic would increase the chance and danger of prolapse of the iris. Traumatism of the lens is always followed by rapid swelling of the lens substance and cataract. If it is from a foreign body and can not be extracted without extracting the lens, it is possibly safer to operate at once than to wait for the lens to become cataractous. Traumatic cataract is difficult to extract, because by the time the cataract develops, syechia posterior has taken place, which increases the difficulty in the removal of the lens. Portions remaining adherent to the iris continue to swell and are likely to fill the pupilary space so as to leave a permanently occluded pupil, which, to my mind, is nearly always followed sooner or later by sympathetic disease in the sound eye. To avoid this, at the time of extrication a broad iridectomy should always be made, removing any injured iris.

Eyes injured by concussion and rupture of the iris, with hemorrhage into the eye, should be treated by rest and mydriatics. Even if the interior chamber should be full of blood and the iris should not be seen, this should be the treatment. The preservation of the sight of the injured eye, in all severe injuries, and the comfort and appearance of the patient are first to be considered; and secondly, the prevention of sympathetic disease, where the other eye is good. Often the latter is of much more importance to be considered than the former, because of the location and the severity of the injury and the small chance of saving the vision, or any great part of it, in the wounded eye. The utmost cleanliness and care should be used to prevent any septic poison

entering these wounds, because a rapid healing and the absence of chronic inflammation following these wounds is the only sure prevention of sympathetic disease. I do not think micro-organisms produce sympathetic disease except through sustaining an irritable condition of the injured eye. While the septic poison may cause the fellow eye to be involved, it does so through reflex action of the ciliary nerve and not by the micro-organisms entering the good eye, but by the effects of the poison on ciliary nerve filaments, thus reflecting a like condition on the other eye. If the micro-organism affects the fellow eye by being carried through the optic nerve and its sheath, why are not the same appreciable pathological conditions found in the optic nerve and the delicate brain matter through which it passes, and why does it not extend to other parts of the brain in its passage and there produce serious inflammatory conditions? I can readily conceive how the disease is transmitted through the ciliary nerves by reflex irritation, but the idea of its passage by the optic nerve without affecting also the other tissue along its track in a more decided way, I can not see. Instead of the disease beginning as we should expect (if it should do this) as a papilitis, it nearly always begins as a cyclitis or an irio-cyclitis agreeing with the relative situation, as a rule, in the affected eye. If of bacterial origin, it is strange the delicate tissue in the fundus of the eye and the sheath are not made to take on inflammatory conditions as it does in the ciliary region.

Hobby, in criticising a paper read by Leber, of Heidelberg, at the eighth International Ophthalmological Congress, takes exception to his statement, viz.: "There is, moreover, in such cases of copper poisoning no danger of sympathetic inflammation." I agree with Hobby, and think the character of metal has nothing to do with the sympathetic disease following. Leber also makes other statements to which I can not agree. One is that the explosion and flame of combustibles destroy any germs which may be adherent, and also says: "It is proper to attempt to save eyes so injured, even if there be pus in the vitreous; provided this can be attributed to the chemical and not to infection."

This assertion follows immediately after saying that the germs were all destroyed by the explosive action carrying the metal into the eye. If his first proposition is correct, "It is always proper to attempt to save those eyes." My experience with foreign bodies of a metallic substance has been that they sooner or later give trouble, and as a rule it is best to enucleate the eye at once if the foreign body can not be removed, which is often very difficult and sometimes impossible. To my mind sympathetic disease is not the result of the character of the foreign body entering the eye, but the result of the location of the injury and the amount of irritation kept up by its presence without regard to any special action of the metal, other than that of a foreign body."

I do not agree with Leber in that eyes having pus in the vitreous and also having the presence of a foreign body can be treated with safety to the other eye. I think such treatment injudicious and hazardous in the extreme.

Enclavement of the iris from wounds in the cornea, or sclera, produce sympathetic disease from oft recurring inflammation of the iris. By care, however, and the use of anodynes, this kind of an eye will sometimes remain quiet indefinitely. If, however, bacteria were present, anodynes would not allay the excitement as they do, and the fellow eye would become involved regardless of such medication. One other condition following wounds in the eye ball, and this will conclude the present discussion; this is the subject of pus found in the body of the cornea, anterior chamber or in the vitreous, from wounds. If hypopion-keratitis results and persists even for a few hours, we must act promptly and energetically. The use of the actual cautery or an electric cautery is recommended. I believe, however, that the thorough curreting of the corneal substance which is sloughing will answer the purpose in many cases fully as well, and is preferable, because by this there is no destruction of healthy tissue, which is not always the case when the cautery is used. I have seen this conclusion by curretting small ulcers from foreign bodies lodging in the cornea, with happy results when the ulceration from these was of an obstinate character. After the curetting the part should

be cleaned with a solution of mercuric-bichloride and dressed with iodoform and carefully bandaged. Should any amount of pus be in the anterior chamber, it should be removed by paracetesis of the cornea. Should pus re-accumulate, it should again be removed. Often much benefit will be derived from the use of a mild antiseptic in the anterior chamber at the time of the paracennesis. In cases of purulent choroiditis from traumatism or other causes, we are advised to treat and rely on absorption in many cases. In refering to the action of metallic substances in the eye with pus in the vitreous, have already said that I regard this kind of treatment as hazardous.

Pus found in any part of the body or in any disease is best removed, and I do not believe that any quantity of pus produced by a foreign body in the vitreous or the deep structures of the eye, will ever be absorbed even if no foreign body was present. I would advise the removal of pus just as we would surely do in other parts of the body. I see no objection to opening the sclero and removing pus in these cases as well as elsewhere.

Inflammatory diseases are not aggravated by an opening in the sclera posterior, say, to the ciliary region. In fact, wounds of the sclera heal rapidly and kindly.

Again, after the formation of pus in the vitreous, we are not likely to have vision to any great extent, and, therefore, no injury to the sight is done by the removal of any existing purulent matter. The perfect recovery of these cases, I think, is rare, and no more disfiguration of the eve will follow than if left alone, for in these cases of deep-seated suppuration, the iris is usually involved, blocking up the pupilary space, which eventually causes enucleation to be demanded to avoid sympathetic disease.

A CASE OF TRACHEOTOMY FOR THE REMOVAL OF FOREIGN BODY FROM LEFT BRONCHUS OF THREE AND A HALF MONTHS' STANDING.

G. W. McCALEB, M. D.,

GONZALES.

John L., a boy three years old, was brought to the offices of the physicians of our town September 10, 1894, the father of the boy stating that probably his son had, in a fit of laughter, sucked a grain of coffee into the wind pipe, as he had been seen a short time before playing with some grains of parched coffee; also patient had several violent paroxysms of coughing. When the patient reached the office his breathing was very much accelerated and labored, but had no paroxysms of coughing; would cough but very little occasionally. I was called in consultation, and we decided to perform tracheotomy, but after getting the patient and instruments ready to operate, his breathing became much better; so we decided not to operate, thinking that we probably had a case of laryngismus. The attending physician kept the patient under treatment for several weeks without any improvement in the patient's condition. The father discontinued treatment till December 16th, when the boy had considerable fever. I was called to see him December 17th, and found patient with temperature of 105° F.; December 18th, temperature 103°. A local pneumonitis had developed in left lung. I advised an operation, and December 19th the patient was chloroformed and I operated, making an incision into the trachea about one and one-quarter inches long, extending down to one-half inch of superior border of sternum. A ligature was introduced on either side of the incision and held by an

assistant, holding the wound open. I introduced a pair of forceps into the trachea through the wound, but after a diligent search, both above and below the wound, I failed to find anything. I tied the ligatures behind the patient's neck and left the wound open, hoping that the patient might expel the foreign body, but with no success. I waited until December 24th, then I introduced a pair of aligator æsophageal forceps into the trachea, and after a considerable search I caught the body and extracted it. It was a parched grain of coffee which had swollen to about three times the size that it maintained after drying. A great deal of pus, mucus and blood was coughed out, following the removal of the grain of coffee. The body was lodged four inches below the superior border of sternum, and about three inches to the left of center of sternum. The wound in the trachea was closed with cat-gut sutures, and the incision in the soft parts was sutured with silk. After this the temperature was about 103° for a week. The "operation was a success," and the patient recovered and is now in good health. I was assisted in the operation by Dr. J. W. Nixon. I selected the lowest point available of trachea to make the incision, because of the superior advantages it would give in introducing the forceps down into the bronchus.

OPHTHALMIA NEONATORUM.

JOHN O. McREYNOLDS, M. D.,

DALLAS.

In the very brief paper which I have prepared for this section I shall omit the discussion of many interesting features of this disease and its treatment, and I will confine myself, for the most part, to its etiology and prevention. Ophthalmia neonatorum is certainly one of the most important of all the diseases involving the eye. First, because it is of such frequent occurrence; second, because of its extreme gravity when neglected, and third, because it almost invariably results in recovery when the proper treatment is established sufficiently early in its career, or can be entirely prevented by prophylactic measures not difficult to employ. This affection is caused by direct infection of the conjunctiva during parturition, or by subsequent contact with something that is soiled with pathogenic material; or it may occur in utero prior to the development of labor. The name, in its broadest sense, includes all acute inflammatory conditions of the conjuntiva of the new-born child. But usually the term is limited to those graver manifestations due to the presence of the diplococcus of Neisser as the special morbific agent. The violence of the blenorrhœa seems to be dependent upon the virulence of the infecting material, so that a simple vaginal discharge will produce a mild form of conjunctivitis, while matter containing the gonococcus will produce a formidable type of purulent ophthalmia. The period of incubation is shorter in the more active forms than in those of less intensity. But since it is not always possible to differentiate in the initial stage a nonspecific conjunctivitis from beginning of blenorrhœa it is well to treat all cases as if they were of specific origin.

This is a wise precaution, not only for the safety of the infant, but of all who may be thrown in close relation with the disease, because it is very frequently communicated from the affected child to other children, nurses and attendants.

The prophylactic treatment should commence in reality at an earlier date even than the development of pregnancy, because it is a position now well established that the gonococcus may remain apparently innocuous for an indefinite period, and then, under the influence of some exciting cause, rapidly multiply, and thus present all the characteristic features of a well marked gonorrhœa. So, if either the male or the female at any previous period, whether rich or poor, and without regard to social position, has ever been infected with the diplococcus of Neisser, we may rationally infer that at the time of confinement there may exist in the parturient canal of the women the special morbific agent which is capable of producing in most aggravated form ophthalmia neonatorum. I dwell upon this point at some length because I have observed that in some cases the attending physician himself has failed to appreciate sufficiently early the gravity of the situation, because of his high regard for the moral rectitude of both man and wife. And while I would rejoice from the bottom of my heart if the truth would justify such confidence in all humanity, we must know that many cases without our definite knowledge have been subjected at some time to specific infection, and that a single exposure is sufficient to bring within the range of possibility the development of ophthalmia neonatorum. But, fortunately, it is not necessary that the eyes of the infant in the vast majority of cases should become affected, even though the mother at the time of labor should present those conditions which are capable of producing purulent ophthalmia in the young. The danger of infection would be diminished by the use of the vaginal antiseptic douches preceding the hours of confinement, thus reducing the amount of morbific material which might find access to the conjunctival membrane of the child.

Immediately after the birth of the child, before it has received

its first bath, and while its eye lids are still closed, the entire region around the eyes should be wiped most carefully and thoroughly with dry absorbent cotton. Then the general bath should be given, taking care that none of the water thus employed shall find entrance into the eyes. Then the eyes should be washed well with a saturated solution of boric acid, then dried with absorbent cotton, and then two drops of a two per cent solution of nitrate of silver should be instilled into the conjunctival sac. There are differences in the details of carrying out prophylactic measures, but the essential principle is to prevent all unnecessary infection by the exercise of cleanliness and the employment of antiseptic solutions to the conjunctival membrane for the purpose of rendering inert and morbific organisms that could not be mechanically removed. And the only question to be determined is what are the best antiseptics to use? But whatever else may be used in conjunction with it, nitrate of silver seems to supply a demand that has never been filled by any other agent; it acts as an antiseptic, astringent and superficial caustic, and what micro-organisms are not immediately destroyed by its action are surrounded by coagulated albumen, which will prevent their activity till they have been thrown off from the eyes as foreign material.

After the disease has become once established the treatment will depend upon the exact conditions present, but a discussion of the therapeutics would lead me beyond the proper scope of this paper. In an excellent paper prepared by Dr. Hilgartner, of Austin, for this Association one year ago, he presented some valuable statistics relating to the prevalence of ophthalmia neonatorum in the state of Texas. His estimate, gathered from an examination of the pupils in the blind asylums, was that about fifteen per cent of the cases of blindness in this state could be traced to ophthalmia neonatorum. It is a disease which is rather more common in the larger cities than in the rural districts, because in the latter we find, as a rule, better hygienic conditions. But it is found in all communities and in every grade of society. The efficacy of prophylactic treatment has

been so repeatedly and thoroughly established that the subject is no longer one that is open to discussion.

To Crede, of Leipsic, is due in large measure the glory of rescuing so many thousands every year from a life of utter blindness. In his own experience in the Leipsic lying-in asylum the proportion of cases of ophthalmia neonatorum out of the entire number of children born was 10.8 per cent prior to the introduction of his prophylactic measures, while the rate went down to one per cent after the preventive system became established. Similar results have been reported by others having a very extensive field for investigation.

Now, the important thing for us to consider at this meeting is this: "What measures shall we individually, or as a body, adopt with a view to the almost complete abolition of a disease which is certainly one of the most important factors in the production of blindness known to medical science?" Education of the people and mild admonition to obstetrical attendants may accomplish some good, but they are not sufficient. But with this disease, as with other contagious affections, it is true that nothing is so efficient as the strong arm of the law. Now, by what means can we secure the enactment of appropriate laws looking to this urgent need? Several states have already statutes relating to this important subject. But with regard to a disease so extensively found all over the country, so rapidly destructive when not met by intelligent treatment at the threshold of its career, and so easily controlled by methods at our command, the broadest legislation is the best. And it would be most desirable to have a law on this question enacted by the National Congress; and if this at present is impracticable, try the State Legislature; and if this distinguished body has no time to consider the public health, happiness and economy, then we can begin with the plain and humble spirit of charity, at home; and I propose, yea, I do now at this very moment petition the city council of Dallas to take such action with regard to this disease as will result in its complete prevention in our city, or successful issue when once developed. And I advise that an ordinance

be enacted similar to the following: First, that all obstetrical attendants, professional and non-professional, shall be required to carry into execution those measures which will protect the infant against ophthalmia neonatorum. Second, that when the disease has become established in any case, efficient medical service shall be secured without delay.

REPORT OF TWO CASES OF INTUBATION OF THE LARYNX.

W. M. MOORE, M. D.,

PARIS.

Last June a year ago, at the meeting of the North Texas District Medical Association, I had the pleasure of reporting a successful case of intubation of the larynx. Today I report two other cases, one of diphtheria and one of croup, presenting an entirely different picture. I regret very much that the notes which I very carefully prepared of the first case which I will speak of were lost, so I am compelled to reproduce them as best I can from memory.

I think it was on Monday, the 1st of October, 1894, that I was called to see the eight months old child of Dr. E——, which was suffering with a severe attack of diphtheria of several days standing, this being the third or fourth case in this family in the past year. A glance at the child convinced me that a delay of a few minutes would place it beyond the reach of all human skill. Regardless of the tender age of the child, as quickly as possible I soon succeeded in introducing the smallest tube made, which is for a one year old child, and had the pleasure of seeing respiration and circulation restored to a comparatively healthy standard. The child did well for several days, and the slight hope that was entertained for its recovery at first grew brighter and brighter every day.

After the tube had remained in for about four days the father began to express a desire to have it removed, saying that he felt confident it could be done with safety. In fact, the child was doing so well I felt myself that the dangerous stage had passed, although the child still had a little fever. However I

objected to removing the tube, contending that it was doing no harm, and that I preferred to err on the side of safety.

I carried my point until the fifth day, when, contrary to my judgment and wishes, I yielded to the desire of the father, who was a physician, and removed the tube. The child could breathe no better without than with the tube. In fact, at the end of three hours breathing was so obstructed that we thought best to introduce the tube, which was done. This time we failed to obtain the relief from the dyspnœa that followed the first introduction. However, it was allowed to remain in until the next Wednesday, when it was thought advisable to remove it for the purpose of cleaning. After removal the tube was found to be free from obstruction. In the meantime breathing still continued so bad that the tube was put back again, but without relief. In fact, breathing was better without the tube. In a short time it was removed again. As well as I remember the tube was introduced in all five times; the last some time during Thursday—eleven days from the first introduction. The child died the following Friday morning.

I am of the opinion that the fatal result in this case would possibly have been different had I not removed the tube as soon as I did. I believe that when the tube was introduced the second time a portion of the membrane was pushed down, that some abrasion of the delicate and highly inflamed membrane of the larynx was produced, and extension downward of the diseased process brought about.

Case No. 2—I was called November 1st, 1894, to see the four year old child of Mr. A——, which had been croupy for three or four days. The family physician had used the ordinary remedies for croup, and I was told by the family that the child had expelled large pieces of membrane, which had relieved the difficult breathing to some extent. This relief, however, was only temporary. I saw the child about 5 p. m. It was badly cyanosed, pupils widely dilated, and pulse very weak. I intubated at once, but as no air appeared to enter the lungs, and breathing seemed suspended, the tube was immediately ex-

tracted and breathing re-established, but was so imperfectly performed that tracheotomy was resorted to. This, too, failed to give relief, the child dying in a few minutes after the operation was completed.

In my opinion this was a case where intubation would certainly have done its work well, had it been done when the obstruction to breathing was first noticed to be so great as to interfere with the proper oxygenation of the blood. As it was, carbonic acid poisoning had already become so profound that the powers of resuscitation were too weakened to prevent the fatal result, even after tracheotomy was done, and artificial respiration resorted to.

Since the above cases were reported I intubated the three year old child of Mr. D——, which had an attack of croup of several days' standing. Tube remained in just five days. The child made a complete recovery.

SECTION ON MICROSCOPY AND PATHOLOGY.

THE ANTITOXINE OF DIPHTHERIA IN PRACTICE.

WM. GAMMON, M. D.

GALVESTON.

In connection with the antitoxine of diphtheria, which is creating so much interest at the present time, it is interesting and not out of place to consider the beginning and development of this principle of therapeutics. Serum therapy may be said to have been begun in 1795 with Jenner's discovery and application of vaccine virus to small-pox. This, however, must be considered as a pre-scientific discovery, if not purely accidental, due only to acuteness in observation, but in no wise representing the study, labor and investigation of the later scientific discoveries. I do not wish to be understood as unwilling to join in with the profession and world at large in giving Jenner the praise that is universally accorded to him for his discovery which has proven to be one of the greatest boons to mankind. Our profession, knowing from experience the ingratitude of the masses, should be the last to attempt to rob any such benefactors of their just, but too often small reward. Nevertheless, we have in our midst today, as no doubt did Jenner in his, incredulous men, who, instead of lending their encouragement to and assisting to establish or disprove the claims of reputed discoveries, hold aloof from, decry and discourage even an investigation. This class of individuals is usually found to be men who are ignorant of the principles involved and shield themselves behind such remarks as "I do not believe in theoretical fads," etc.

When Pasteur placed serum therapy on a scientific basis by his discovery and application of attenuated virus in hydrophobia, he not only did a great good for that class of unfortunates, but placed himself on a level with that great and earnest worker, Koch, in promoting the development of serum therapy in general in a scientific manner.

Although Koch's tuberculin did not come up to the expectations of its discoverer it can not justly be called a failure, as we are forced to admit, since the success of Behring's antitoxine of diphtheria, that the work was in the right direction. We can but feel confident that tuberculin will come before the world again in the near future with power to relieve a certain class at least of the phthisical.

The tuberculin of Koch was of the toxin itself, and the benefit derived from it was because of the stimulated inflammatory action produced around tubercular forci, which has a tendency to cause encapsulation and isolation of the bacteria. This would have given this remedy an important place in therapeutics had it not been for the accidents which occurred because of the stimulation of defensile inflammation.

The accidents are thus due to the facility with which engorged vessels take up and disseminate the bacteria, thereby increasing the frequency of dissemination.

The first antitoxine perfected, that of tetanus, has in the laboratory been proven a success; yet in practice it is almost, if not quite, a failure. This failure, however, cannot be laid at the door of the serum therapist. The explanation of the practical failure is that when diagnosis of tetanus is possible the destructive process is in the last stage. When the diagnostition comes to the rescue and discovers the existence of the disease at an earlier stage, tetanus antitoxine will then probably be a success in practice as well as theory. Fortunately the diagnostition in the case of diphtheria is able to detect the presence of the disease in time to make use of the therapists' discovery. The results from Behring's discovery of the antitoxine of diphtheria is so decidedly in its favor that though but

a short time out of the laboratory, it is already largely accepted as a success. In order to have some understanding of the probable way in which antitoxine renders immunity, it is necessary to review briefly the toxine and its effects.

When a susceptible animal becomes infected with a disease due to a specific organism it must, if it recovers, acquire an immunity permanent or temporary. So we learn that when a susceptible animal serves as a host for the development of specific bacteria, some change takes place in the animal's tissues which render it unfit as a medium for the further growth of the organism. The first theory advanced to explain the symptoms produced by micro-organisms was that of purely mechanical irritation of the cells. This theory was of necessity discarded when it was learned that in certain diseases the focus of infection remained local, while the symptoms became systemic. Then the theory that the general symptoms were caused by the abstraction of oxygen from the tissues shared the same fate as the one which preceded it when it was shown that certain specific bacteria thrived only in the absence of oxygen. Later experiments demonstrated that certain bacteria when scraped from the surface of a pure culture passed through a neutral medium, then killed by moderate heat, would, when introduced into the peritoneal cavity of a susceptible animal, produce symptoms of poisoning, and in large quantities, death. This proved that a toxic principle existed in the protoplasm of the cell and further experimentation demonstrated that gradually increasing doses of the dead bacteria would eventually render an immunity against that poison, but further experiments with an animal thus rendered immune, demonstrates that if the culture medium in which the organisms have been grown be introduced into the animal's circulation, symptoms of poisoning follow, and if the dose be sufficient, death. This shows that a poison exists in and probably elaborated by the bacteria in its medium of growth. The protoplasmic poison exists only in a few of the bacteria and there usually in small proportion to the last named poison or toxine. Experiments

with the toxine in the same manner in which the dead bacteria were used to render immunity against the protoplasmic poison results eventually in not only immunity to the toxine, but prevents the growth of the bacteria which produced this toxine in the animal thus treated. This animal may be said to possess an artificially acquired immunity.

Now, the serum of a recently immunized animal, whether that immunity be acquired from having served as a host for the development of the bacteria or from the administration of the artificially obtained toxic principle, has the power when administered to a second susceptible animal of producing immunity in that animal.

From these experiments we are forced to conclude that a specific germ elaborates in its medium of growth a toxine, and this toxine in some manner elaborated in the animal tissues another substance that not only prevents the toxine from producing its physiological effects, but prevents the growth of the bacteria which produced the toxic principle, the antitoxine. Just how the substance is formed is probably by a stimulation of the function of resistance which is normally possessed by all cells, this causing a production of something akin to the alexins of the blood which represents a natural antitoxine. Of course this is only a theory, as is also the explanation of the action of the antitoxine. That the antitoxine is not purely a chemical antidote is certain, as the following experiment plainly illustrates: To a susceptible animal is administered ten times the dose of toxine which by experiment has been shown sufficient to cause death, then the quantity of antitoxine which is just sufficient to save the animal's life is determined. This being done, both doses are administered to a larger animal simultaneously and found to be fatal. This shows that were the antitoxine a chemical antidote to the toxine the antitoxine would have neutralized the toxine in the large animal as well as in the small; but if the cell theory be applied it may be supposed that the given quantity of antitoxine was sufficient to effect the necessary training the cells, thereby rendering

them able to resist the poison, while in the larger animal the quantity of antitoxine was insufficient to train the larger number of cells thereby leaving, them practically defenseless to the poison. However this may be, we are assured of the good effects of the antitoxine and we will pass to a brief description of the method of its preparation, which is practically the one adopted by Roux.

From a test tube culture of the Klebs-Loeffler bacilli taken from a virulent case of diphtheria, several guinea pigs are inoculated to ascertain its virulency. Several of the most virulent cultures are selected for the preparation of the toxine and transferred from the culture tube to a flask of nutrient bouillon. The flask is placed in an incubator for from twenty-four to forty-eight hours; at the end of which time the flask is removed, and if the bacilli are growing properly the flask is connected by side necks to an exhaust pump on one side and a wash bottle on the other, so arranged that a free supply of oxygen passes through the culture flask. Experiments with the diphtheria bacilli have taught that the culture medium must be kept alkaline, and that a free supply of oxygen furnishes the best means to this end. In from two or three weeks' time the bacilli have elaborated in the bouillon sufficient toxine with which to begin the process of immunizing an animal. The toxine is now tested on guinea pigs, and if found to be virulent is filtered through a Chabsland filter, which frees the toxine from micro-organisms, after which one-half per cent carbolic acid is added and the toxine is ready for use. An animal is now selected, which is usually a horse, because of the quantity of antitoxine which he is capable of furnishing, his susceptibility to the poison, and, most important of all, his serum, produces no bad effect when introduced into the circulation of man. The administration of the toxine is commenced in small doses (5/10 c. c.), increasing each dose until at the end of four or five months 3 to 400 c. c. of the toxine may be administered without reaction. The horse is now considered to be able to furnish sufficient antitoxine for therapeutical purposes. Care is taken not to withdraw any blood until

the animal is fully recovered from the last dose of toxine, lest some of this poison be withdrawn in the serum, which would, of course, only intensify the symptoms when administered to a diphtheria subject. The blood is drawn from the jugular vein through a canula into sterilized flasks to the amount of ten or twelve pounds, the operation, of course, being antiseptically carried out.

This operation may be repeated every week or ten days, with the occasional administration of a large dose of toxine. The blood is placed in a dark, cool place for three or four days to allow the separation of the clot. The separated antitoxine is now standardized in the following manner, e. g.: A number of guinea pigs are weighed and varying doses of antitoxine are administered to each. Twelve hours later living virulent bacilli are injected in sufficient quantity to kill an unprotected animal in thirty-six hours. The strength of the antitoxine is estimated by comparing weight of antitoxine necessary to protect the animal to the weight of the animal; thus in a guinea pig weighing 300 grams requires 1/300th part of its weight of serum to be protected from a fatal dose; the antitoxine is said to possess 300 units in strength.

As to the technique of the administration of the antitoxine it may be summed up as follows: A large hypodermic syringe of about 10 c. c. capacity, or preferably a Koch's lymph syringe, which can be more effectually sterilized, is necessary. The syringe may be sterilized by boiling, and the serum drawn through the needle immediately from the bottle or from a sterile cup of small size into which the serum has been poured. A place is now selected for the injection, which must be some part over which the skin is loose and affords sufficient cellular tissue to accommodate the injection, the skin of the abdomen, chest or buttock, either answering quite well. The part selected must be thoroughly cleansed with soap and an antiseptic, after which the fluid may be slowly injected. If a very large needle be used, though it is not essential, local anæsthesia may be had by the use of ice and salt, or the ether spray applied to the spot at

which the injection is to be made. After the needle is removed the finger should be held over the puncture for a few moments, after which it may be sealed with flexible collodion. Massage is not necessary, as the serum being of the same nature as the blood serum, it is quickly absorbed. Experiments in the administration of the antitoxine to animals shows that more of it is required to protect when the poison is introduced with the antitoxine than in a case where the antitoxine is administered first.

The quantity of antitoxine must be still greater when the poison is administered first. The same rules hold good in the clinical application of antitoxine; so we find that the preventive dose may be small. The dose administered early in infection must be larger, and the dose administered later must be proportionately increased. The serum to be obtained in this country at present is practically only that which is prepared by the New York Board of Health and represents 50,000 units of strength, and is prepared after Roux's formula. The preventive dose is given as 1 c. c. for a child and 2 c. c. for an adult. The curative dose is 10 to 12 c. c., repeated in twenty-four to thirty-six hours if necessary.

In mild cases a single dose is usually found sufficient, and after administration the temperature rapidly subsides, the membrane liquifies, and the patient's condition is entirely, almost marvelously, changed for the better. If, however, at the end of twenty-four to thirty-six hours the temperature has not fallen below 100½°, it is thought advisable to administer the second dose, which is usually sufficient to effect the cure.

The following two cases treated in the John Sealy Hospital, Galveston, which came under my personal observation, are reported partly to record the cases and partly because of the interesting sequelæ:

CASE I.—H. R., age seventeen, German; female; servant. Patient had been employed in a family in which a case of diphtheria had occurred, at which place she developed an angina and was sent home on the second day. On examination a small gray patch was detected on

to the bottom. Cotton is packed around the handle in the neck of the tube, allowing the free end to project two or three inches. This whole affair is sterilized by subjecting it to dry heat until the cotton has commenced to brown. The discharge may be obtained and sent in a tube thus prepared by removing the swab and carefully mopping away some of the secretion, then carefully replacing the mop. This may now be packed in a light wooden or paper box and mailed. When the tube reaches the laboratory the swab may be removed and brushed over the surface of the culture medium selected for growth and isolation of the bacilli.

AN OUTLINE OF THE PHYSICAL THEORY OF FERMENTATION, IMMUNITY AND INFECTION, AND ITS BEARING ON THE RATIONALE OF SERUM THERAPY.

J. W. McLAUGHLIN, M. D.,

AUSTIN.

Certain characteristics of the acute infectious diseases, as, for example, (1) the immunity that a single attack of one of these generally gives an individual to other attacks of the disease, and (2) the self-limited duration to which diseases of this class are usually limited, must have greatly puzzled physicians in the early ages of medicine, when the means of scientific investigation were meager, and the scientific data then accumulated was so scant that inquiries into questions such as these, were in large part necessarily along the lines of a posteriori reasoning; and yet the conclusions then arrived at were often so correct that in many instances the large mass of scientific facts that have been accumulated to the present time by workers in the various departments of science, and by means of scientific aids, as mechanical devices, instruments of precision, etc., can often be placed and made intelligible only by theories of our old-time thinkers; without these old theories to orderly arrange and interpret the accumulated scientific facts, these often mystify rather than instruct us.

The vast amount of isolated, bio-chemical facts relating to bacteria, and to the toxins and tox-albumins that result from the vital action of bacteria on their food media, and the evidence that products of the action of bacteria—toxins and tox-albumins—are intimately and causatively associated with the characteristic features of the acute infections that have been mentioned,

and the remarkable phenomena of acquired immunity and of serum therapeutics, furnish an excellent example of the accumulation of knowledge of a certain kind that can not be fully utilized for the reason that the facts which have been acquired by the inductive method have outgrown their classification and interpretation by deductive theory, and also furnish an illustration wherein an old theory of fermentation, by Stahl, over 200 years ago, is better able to harmonize, unify and interpret the known facts of infection, immunity and serum therapeutics, than any yet offered, when this theory is modified by adding to Stahl's conceptions of motions in matter the knowledge that has since been acquired of this subject.

Stahl divined that fermentation and putrefaction are closely allied processes, and starting from the well known infectious nature of the latter explained both as disturbances in the molecules of the fermenting body brought about by a pre-existing molecular motion.

Liebig used this theory as the basis of a new theory of fermentation and putrefaction, which he also regarded as analogous processes. His theory attracted universal attention, and was everywhere received until it was finally overthrown by the epoch making researches of Pasteur.

Looking back upon these theories from the present standpoint, and in the light furnished by recent discoveries in molecular physics, it is seen that Stahl's knowledge, and the knowledge of his age, of motions in matter, were crude. The definite and distinctive motions in periodic time that atoms are now known to have, was unknown to Stahl; to him atomic motions were not definite and distinctive of the kind of atoms, but of the kind of motion they received from other moving bodies, hence the atomic motions of a mass would move only, and in the same manner, as they were acted upon by other atomic motions. The present belief is, that while atomic motion is definitely related to atomic heat measured from an absolute zero, and to the mass and form of the atom, it is always distinctive of the kind of atom moving;

hence the vibrations of all oxygen atoms are alike, and this is true of all other kinds of atoms.

The motions to which Liebig ascribed the changes in fermentation and putrefaction were those induced by the dissolution or disintegration of albuminous substances, which, he claimed, were imparted to, and induced like changes in, other substances with which they were in contact.

When Pasteur confirmed the results of his predecessors, and proved beyond any question that fermentation and putrefaction are caused by living micro-organisms, and are absolutely dependent on the vital activity of these, he completely overthrew Liebig's theory that these processes are caused by dead albuminous substances undergoing regressive changes, and that microbes had nothing to do with them. But when Pasteur leaves behind him the facts that he established regarding the connection between living ferments and fermentation, and enters the field of theory to explain the rationale of fermentation and putrefaction, he is no longer invulnerable; his theory is about as defective as that of Liebig's.

When the modern concepts of atomic motions are engrafted upon Stahl's theory, and this is further corrected by giving to ferments living properties that Pasteur has conclusively proved them to possess, a true basis will be furnished upon which, I think, a theory of fermentation, and the closely allied processes of putrefaction and infection, can be formed that will rationally explain all the phenomena of these processes. Now, immunity to a disease is a condition of an organism, say man, that enables him to withstand an infection; there must, therefore, be an intimate relation between infection and immunity in the underlying cause which give rise to these conditions. Likewise, the intimate causes which arrest infectious diseases, whether these operate in the natural course of the disease and give to it its self-limited duration, or whether they are produced artificially by antitoxines and arrest the progress of the disease when they are artificially introduced into the body, there must be a definite

relationship between the rationale of their action and that of the toxine of the disease they oppose.

If, now, fermentation and infection are analogous processes, that arise from similar underlying causes, as we are taught to believe by the most eminent medical teachers of the past and present ages, it must be evident that an understanding of fermentation, which is a comparatively simple process, will furnish a key that will unlock the mysteries of infection, immunity and serum therapy, that are comparatively complex phenomena. I will not ask you to accept the statements of others, however eminent, that fermentation and infection are closely allied processes, but will present some of the analogies, that you may decide for yourselves the truth of this position. They are as follows: Fermentation has for its active cause a living one called micro-organism, that constitutes the ferment; infection has for its active cause a living one called micro-organism, that is the infectious agent. Each kind of fermentation is caused by a specific ferment micro-organism; each kind of infectious disease is caused by a specific infectious micro-organism. Fermentation pursues a definite course of self-limited duration; acute infectious diseases pursue a definite course of self-limited duration. The products of fermentation will arrest the process when a definite amount of these accumulate in the fermenting solution, for example, alcohol will arrest vinous fermentation when a certain per cent of alcohol has accumulated in the solution; the products of infection will arrest the disease, and thus give it the feature of self-limitation, when a certain per cent of the products have accumulated in the system.

When the complex changes that occur in the human body by the introduction of infectious bacteria, are contrasted with the relatively simple changes that occur in a fermentable solution by the introduction of ferment bacteria, the evidence furnished by the analogies mentioned seems conclusive that the underlying causes which determine the phenomena are identical in both cases. It behooves us then to learn the nature of these causes and the rationale of their action. Beginning the investigation

with the rationale of fermentation, the most important question that is presented is, how ferments excite fermentation? Is this a chemical or is it a physical action? If it is chemical, the ferment organisms must secrete or excrete a chemical substance that induces fermentation by acting on matters contained in the ferment solution. It may be mentioned, by the way, that this view is adopted by many bacteriologists regarding those products—toxines and tox-albumins—of infectious bacteria; they are regarded as secretions of these microbes. I hold this view is altogether incorrect, and that it has caused much of the mystery that surrounds the subject of immunity. We are not left in doubt regarding the matter as it relates to fermentation; there is no longer any question that the induction of fermentation by ferment bacteria is not by chemical means, but is purely a physical process. Helmholtz, Mitscherlich and Hoffman have decided this question by a simple experiment. They found when sterilized grape juice was put into a bladder and this was immersed in fermenting grape juice that the grape juice in the bladder did not ferment. In this experiment there was a free interchange of fluids—that contained in the bladder and the fermenting solution—by osmosis, and by the same agency any soluble chemical substances contained in either solution would readily pass to the other; therefore the absence of fermentation in the grape juice contained in the bladder is conclusive against the chemical hypothesis. Other experiments, conducted by the same persons, gave the same results.

If the process is not chemical, it must be physical, and this view is strongly supported by the following facts, viz: (1) the ferments act only when in contact with the substance they ferment; (2) the products of fermentation contain in the aggregate the same elements and proportions that was contained in the ferment substance that disappeared during the process. For illustration, the alcohol, carbon dioxide, succinic acid and glycerine, that result from a vinous fermentation, contain in the aggregate the same atoms and proportions that was contained in the sugar that disappeared; the sugar is simply

transformed into these products, and there is no substance added from the ferments as there would be if the action was chemical.

What is the nature of the physical energy by which ferment bacteria induce fermentation? It is well known that bacteria are able to reduce many substances even of the most refractory nature, and that it is by this means that they break up or dissociate fermentable substances, but the modus operandi by which they accomplish this is not known, and it is of this power that I shall now attempt a theoretic explanation. A knowledge that bacteria are reducing agents does not alone convey information of the underlying principles they use to accomplish the work, the nature of these principles which we must understand, before we can comprehend the causes that make fermentation, infection, immunity, and serum therapeutics analogous processes. Stahl, it will be remembered, believed that fermentation is a disturbance in the molicules of the fermenting body brought about by a pre-existing molecular motion. Let us now examine this conception in the light furnished by the knowledge of molecular physics that has been acquired since Stahl's time and see if it does not furnish a basis for a rational theory. A molecule is the smallest division of a compound substance in which its properties inhere, and is a complex body composed of atoms that usually are dissimilar. An atom is the smallest known division of an elementary substance and vibrates in periods of time that are characteristic.

When now you draw a mental picture of a molecule, it will be a globular elastic body composed of many atoms that are separated from each other by a repelling force, yet drawn together by an attracting force. The various atoms of the molecule will be in active motion, each kind of atom vibrating alike, but unlike its companions. The spaces within the molecule and between the atoms will be filled with ether, that fills all space, which will be thrown into corresponding waves by the vibrating atoms. Now, ether waves, like waves in other media, are subject to interference, consequently the interatomic ether waves

within a molecule will interfere and adjust themselves so that the molecular waves are the result of atomic waves plus the effect of their interference. The amount and kind of interference that will occur between the atomic ether waves of a molecule will be determined by the manner in which the atoms within the molecule are grouped. The nature of the ether waves of a molecule will then be determined by three factors, first, the kind of atoms it contains, second, the manner in which these are grouped in the molecule, and third, the resultant of atomic ether wave interference within the molecule. All molecules are, then, surrounded by a zone of waves—molecular waves—whose nature is determined by the three factors named, and whose energy is probably in an inverse proportion to the square of their distance—characteristics that Stahl was not aware of.

The energy that molecular waves lose in size they make up in frequency, as they are believed to recur millions of times in a second. I will not attempt at this time to show that the energy of heat, light, sound and electricity is energy of wave motion; suffice it that this is not a novel conception, but an accepted truth of science. Now, the energy of waves in any medium is increased, diminished or destroyed by other like waves according as they coincide, partially coincide, or do not coincide. Illustrations of this truth will present themselves in waves of water, that are increased, diminished or destroyed by other water waves that coincide, partially coincide, or do not coincide with the first in their upward and downward motions, and in the interference in waves of sound and light. The same is true of molecular waves and is an important fact to bear in mind.

It will not be denied, of course, that all matter is molecular; ferment bacteria and fermentable substances are molecular; likewise pathogenic bacteria and the matter of the human body on which these bacteria act, are all molecular in structure; hence the war that was waged by these various bacteria on susceptible substances is a molecular war, and can best be studied from the standpoint of molecular physics. For example, the yeast cells that constitute the living vinous ferment are one-celled micro-

organisms, which are an orderly aggregation of living molecules. These molecules have energy, that is determined by the nature of the molecular waves, by which they not only dissociate sugar in the fermentable solution, but determine the molecular nature of the substance that can be formed by a chemical rearrangement of the atoms that have been dissociated; in fact, the power to determine what ferment products can be formed is a necessary result of the power of bacteria to dissociate a substance, and, what is still more remarkable, no ferment products can form that are not inhibitory to the action of the ferment. The yeast cells dissociate the sugar in the fermentable solution, because the molecular waves of the yeast coincide with those of the sugar, which, being the less stable, yields to wave impacts of the yeast which drive the sugar molecules further and further apart until, finally, they are forced beyond their chemical attractions and the sugar is destroyed. And now a remarkable phenomenon occurs. The elements of the sugar that are liberated from former attractions must again combine, *but do this under the influence of the molecular waves of the yeast ferment. This influence determines the nature of the resulting products, and none can form under this wave influence except those whose waves are inhibitory.* Alcohol, the principal product of vinous fermentation, we have seen, is inhibitory to the vinous ferment, and this but represents what is true of other ferments or pathogenic products; they are necessarily inhibitory to the causative bacteria, and this is a necessary result of the wave influence under which they are formed.

That the products of cell action inhibit the physiological function of cells, and even totally arrest this, when the products have accumulated in sufficient amounts, is a general law that applies to cell life in general, and furnishes an explanation of the benefits of therapy that is directed to "acting on the secretions."

The inhibitory action of ferment products to fermentation, and of pathogenic products—toxines and tox-albumins—to pathogenesis, have long been recognized, but the rationale of this

action has not been made known, and the cause of the self-limited duration of acute infectious diseases, the immunity that is induced by inoculations of bacterial cultures that contain the tox-albumins of the bacteria, and by what means the toxines and tox-albumins of bacteria, when gradually introduced into the tissues of a healthy animal, transform the albuminoids of its blood serum into immunizing and curative substances—antitoxines—are questions which promise to yield up their secrets to investigation along the lines herein indicated, I will briefly outline the probable modus operandi by which these results are to be accomplished. The products of the vital activity of pathogenic bacteria—which are termed toxines and tox-albumins—are admitted to be the essential cause of infection when they are introduced into a susceptible organism in sufficient amount, and the cause of immunity to infection when they are inoculated, first in small doses, and then in gradually increased doses, as the system becomes tolerant. Toxines and tox-albumins are further believed to be of the nature of unorganized ferments, and to act within the susceptible organism as ferments do in fermentable solutions; that is, these toxines, by means of the energy of their molecular waves, dissociate and transform into inhibitory bodies such loosely-combined substances, within the organism, whose molecular waves make them susceptible to the molecular energy of the toxines. It will be observed that inhibitory bodies must result from the nature of this action, as they do from that of fermentation, and the cause of inhibitory power of these bodies, in the one case as in the other, is in the character of their molecular waves, which are the opposite or antagonists of the primary ferment, because of the wave influence under which ferment products are formed. The substances, say, in man's body that most probably are dissociated by pathogenic bacteria are the albuminoids of his fluids. The albuminoid molecules are massive, quite complex and have lines of weak union along which they are easily broken; besides the difference between a harmless and harmful albumen is often small and purely an arrangement of its molecules. Further-

more, there are good reasons for believing that albuminoids of the body exist in many isomeric forms; consequently the isomeric bodies would be affected differently by a species of pathogenic bacteria. One, or more, or none, of the isomers may be susceptible; if they are susceptible they would be transformed by the wave energy of the bacteria into toxines, and the subject would become infected; if none of the albumen isomers are susceptible, that is, if the molecular vibrations of none of the isomers coincide with the molecular vibrations of the bacteria, no toxine can be formed, and no infection will occur. When toxines are formed, and infection occurs, the toxines, themselves, by means of the energy of their molecular waves, produce changes in such groups of albuminoids whose molecular waves are susceptible. This action is twofold and opposite; in one case it is those albuminoid molecules whose waves oppose those of the toxine; in the other case it is those albuminoids whose molecular waves coincide with the toxine that are affected. In the first case the albuminoids that are affected are the same that are susceptible to the bacteria; that is, whose molecular waves coincide with those of the bacterium, and as the toxine of a bacterium will inhibit the molecular waves of the bacterium, it must also inhibit those albuminoids that are susceptible to the bacterium, as the molecular waves of the two are coincident.

The effect that would most likely result when the molecules of two substances, whose waves conflict, are brought together, is that the waves of the one possessed of the most energy would first overcome the waves of the weaker, and then whatever amount of wave energy that is carried over would act directly on the weaker molecules, and tend to disarrange the atomic grouping within these; that is, to convert them into other isomers, and thus render them immune to the bacterium, because the change in molecular structure of the albuminoids—that were susceptible to the wave action of the bacterium—produce a corresponding change in their susceptibilities, *i.e.*, makes them immune to this bacterium. This, I believe, is the cause of acquired immunity; those groups of albuminoid molecules

that are susceptible to the dynamic energy of the bacterium are made non-susceptible to the influence by the toxines that are formed during the progress of the disease, or that are artificially introduced into the blood.

Susceptibility of man to a pathogenic bacterium is then determined, from my standpoint, by the susceptibility of one or more groups of albuminoid molecules of the fluids of his body. Infection of the individual, or the artificial introduction of the infectious agent—toxine—destroys his susceptibility by changing the molecular structure of his susceptible albuminoids. And the permanency of acquired immunity is determined by the permanency of the changes impressed on the albuminoids by the dynamic energy of the toxine.

It will be observed that this theory requires the harmonious action of two factors before infection of an individual can occur. They are as follows: (1) pathogenic bacteria, and (2) susceptibility of one or more groups of isomeric albuminoids.

The introduction of pathogenic bacteria alone is not sufficient. Unless there are albuminoid molecules in the fluid of the body that can be transformed into the toxines of disease by the wave energy of the molecules of the bacteria, no infection will occur.

The different behavior of the pathogenic bacteria introduced into the tissues of an immune person, from the behavior of the same bacteria in a non-immune or susceptible person, has greatly puzzled bacteriologists, who have been handicapped by the prevailing theories of immunity. In immune persons pathogenic bacteria are englobed and destroyed by phagocytes, and no infection occurs; in non-immune persons, the same bacteria drive away the phagocytes and infection of the individual takes place. Now, under the prevailing opinion, that pathogenic bacteria secrete or excrete toxines, and are, therefore, always pathogenic, no rational explanation can be given why the phagocytes will destroy bacteria in one case, and be destroyed by them in the other case, but when viewed from the standpoint of the new theory the explanation is quite simple; pathogenic bacteria do not form toxines in the immune, and the phagocytes, whose function

is to destroy inert or innocuous matters in the body, destroy such bacteria as they would other innocuous matters. The case is quite different in the non-immune or susceptible individual; here there are susceptible albuminoids that the bacteria transform into toxines, which are poisonous to phagocytes, and hence the explanation of their rapid disappearance.

Why the chronic infectious diseases are not self-limited in duration, and can not be successfully vaccinated against, as the acute infectious diseases are, is another puzzling question that is simply answered by the new theory. It will be remembered that it is the loose, unstable albuminoid molecules of the fluids of the body, such as the albuminoids of the blood serum, that have their molecular structure changed by the molecular wave energy of the toxines, in the process of immunizing them. The albuminoid molecules that are susceptible in chronic infectious diseases, such as tuberculosis, lupus and actinomycosis are, on the contrary, in the fixed cellular elements, and the infective process is therefore more localized, while the molecules within the cells of fixed organized structures are less vulnerable to the wave energy of toxines, and the structures that are affected by them are limited to the immediate locality of the charge. Besides the changes that are produced in the tissues by the molecular wave energy of the toxines of chronic infectious diseases are destructive of such tissues. For these reasons tuberculin was necessarily a failure, as it rapidly destroyed tissues that had previously been weakened by the vibrations of the tubercle bacilli or of bacterio-protean, or that were quite susceptible to these vibrations. The results obtained by Pruden in his inoculations of dead tubercle bacilli, indicate that miliary tubercles may be caused by bacterio-protean; the causation of tubercles is then the result of the wave energy of tuberculin.

Of course, the condition of a person's nervous system exercises a considerable influence upon the resisting power of his albuminoids to the disturbing influence of infectious bacteria. In conditions of good health the albuminoids have more resisting power than in bad health of the person, while fear and other depress-

ing emotions render him more susceptible to infectious bacteria.

The remaining question for consideration is the explanation this theory offers of the rationale of serum therapy. Assuming that the same underlying principles control serum cures in all diseases to which this treatment is applicable, I will confine my remarks to the curative treatment of diphtheria by antitoxine, as this represents the rationale of all serum cures, and attempt an explanation of the rationale of its formation, and its action. A healthy horse is selected, and into his tissues are injected a sterilized culture of the diphtheria bacillus, beginning with very small doses, and gradually increasing the dosage until the horse finally becomes tolerant of highly lethal doses. In this condition he is poison proof to the toxine. He is now bled, and the blood serum, separated from the clot, is the agent, called antitoxine, that is used by hypodermic injection to cure diphtheria in man. The diphtheria culture that is used to render the horse poison proof is the culture liquid from which all diphtheria bacilli have been carefully removed, and it contains the diphtheria toxine in a highly concentrated condition. Of course, it is the toxine this fluid contains that gives it its potency, and it is the toxine alone that inaugurates those changes in the blood of the horse that result in the development, in this fluid, of antitoxine. Here we have another illustration of that general law to which I have referred, that the products of cell action are inhibitory, or opposing bodies. The toxine of diphtheria has the nature of a ferment, and in the blood converts all albuminoid molecules that are susceptible to its wave energy into antitoxine by virtue of the law, that the nascent atoms of a substance that has been dissociated by a ferment can not recombine under the influence of the waves of the ferment, except the combination is one whose waves inhibit those of the ferment.

The process by which toxines transform susceptible albuminoids into antitoxines is quite different from the process by which toxines render susceptible albuminoids immune. In the first instance the molecular waves of the toxine and the albuminoids are coincident—no antitoxine can be formed in the absence of such

albuminoids—and the product, antitoxine, remains only temporarily in the body. In the other instance the toxine and albuminoids concerned do not have coincident waves; on the contrary, the waves oppose each other, and those of the toxine having more energy, must first overcome those of the albuminoids before the remaining energy of the toxine can cause a rearrangement of the atomic elements of the albuminoids. Such changes do not impair the influences of the albuminoids, and they are therefore retained, and give immunity as long as the change in molecular structure persists.

In conclusion, I wish to apologize for not presenting this subject as clearly and intelligibly as I wished to, and I fear my failure to do this may prevent the reader, unless he thinks as he reads, from following the argument. The whole subject matter is so new, and is so much out of the line of argument usually pursued by medical writers, that a clear and intelligible exposition of the new theory would require more space than I can ask to occupy. Those who feel sufficiently interested in the new theory to further investigate, will find in a little volume entitled "Fermentation, Immunity and Infection," that I published in 1893, a fuller exposition of the subject.

FURTHER REMARKS UPON PARASITES.

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SAN ANTONIO.

Since the publication of the article submitted to the Texas Medical Association last year (*Texas Medical Journal*, 1894, p. 613) certain of the comments made therein have been held up to friendly criticism by Prof. C. W. Stiles, one of the helmintholo-gists connected with the government institutions at Washington (*Medical and Surgical Reporter*, November 17, 1894). I should like to make a correction of a rather curious blunder which crept into my article of last year, and which has caused Dr. Stiles to question the value of the paper, I fear. It will be remembered that I referred to the discovery in the water of certain wells of the "*scolices*" of the *tænia mediocanellata;* this should have read "*proglottids.*" I can not well imagine how the word should have been incorrectly written by me. I am glad, however, to be able to correct what was an inadvertant blunder. With such acknowl-edgment, let me mention several instances of such occurrence, evidently the sources of severe infection. I can recall just now two cases where I saw and examined the bodies found in the well myself, and I have had similar observations mentioned to me by other persons, patients of mine. In 1875 or '76 an eminent mer-chant of this city, with a family of several children, brought some links of a tænia to me which had crawled out of the rectums of the children, and at the same time told me that similar bodies were to be found in his well. I did not believe the latter part of his story, but upon examining several specimens of his well water I found the same kind of proglottid in the water, not dead, but alive and crawling. The privy was not far from the well, and the negro used to wash the chamber vessels near the well,

so that the presence of the proglottids could be easily explained, but the fact that they were alive puzzled me. Some physicians claim to cure persons infested with tapeworm by inundating the intestinal tract with water *per os* and *per rectum*, and state that often the worm is killed and expelled in that way. From appearances these headless links seemed to be enjoying an independent existence. The family was relieved by a decoction of pomegranate of several large *tæniæ mediocellatæ*. The home of this family was in a dry locality in the town. The identical history occurred in the family of a printer and editor a short while previous to the last mentioned case. This gentleman lived in the city, near the San Antonio river; the well was shallow and close to the privy. In this instance, too, the proglottids were of the beef worm, and it was likewise expelled by the employment of a pomegranate decoction. It is generally admitted as an established fact that all the tæniæ have first to undergo the cysticercus or echinococcus stage before forming the mature animal. From the above observations, however, it seems possible that proglottids may be expelled from one host *per anum* and under occasional circumstances get into the stomach of a second host, where the eggs contained in the links might directly produce a tapeworm without previous cysticercus stage. At least upon the setting free of so many eggs at one time, it is not improbable that some of cysticerci would develop at once upon the mucous wall of the alimentary tract, thus accounting for the occasional cases of tapeworms in persons duly careful of diet. Such circumstances of transmission would make possible, too, the establishment of the bladder worm or cysticercus stage in the second host. Dr. Stiles comments upon my reference to the cysticercus stage in man, remarking that it does not occur in man. This latter is, however, a mistake. During my student days in Bonn, under Professor Webber, in 1837, I have seen several cysticerci in cadavers, to which the professor called the the attention of the students. In 1867, while on a visit in Berlin, I saw several cysticerci of the eye exhibited to the class in

Professor von Græfe's hospital, and heard of several other cases mentioned as observed elsewhere.

With reference to Dr. Stiles' belief that in my account of the frequence of the *tænia echinococcus* in dogs and mule rabbits in this state I have unconsciously included a number of species, I have but this to say. In Europe *echinococcus* is common in the hare (*lepus timidus*); and in nearly every mule rabbit I have examined I have encountered a similar form, having all the appearances of an echinococcus, viz.: Compound cyst with tænia heads attached to the walls or sometimes only hooklets found in the liquid of the cysts. The parasite is so common that people abstain from eating the animal, although the flesh is very good. Among other forms of wild life I may mention in passing that the common field lark in Texas is also the host of a parasite quite frequently, a round worm over an inch in length, found usually in the pectoral muscles. It is so common that only about one lark in ten is without it. The same is true of the frequence of the *tænia echinococcus* in dogs, which Dr. Stiles doubts. On two occasions I have had occasion to dissect a good number of dogs. In 1872 we observed trichinosis in several families and found the parasites in the pork and sausages from which the families had been eating. In order to try the vitality of the trichinæ in the sausage, I fed a number of dogs with the same, and made *post-mortem* examinations with a view of finding interstitial trichinae. I found none, probably either because the dog is not a good experimental animal and digest the trichinae, or the sausage was too old; but in each dog I found a very small tape worm, not longer than one inch, which was certainly identical with *T. echinococcus* and very dissimilar to the other varieties of tapeworm which infest the dog and are of much larger size. In 1874 we had an epizootic of rabies among the dogs (two men bitten died from hydrophobia) and by police orders a very large number of the town dogs were killed, some of which were dissected by me; and in the majority of them I again found the above mentioned parasite. The frequency of the cysticercus or echinococcus stage of a certain

tapeworm is probably not caused by the frequency of occurrence of the corresponding tapeworm in other animals, but depends on the facility of contamination with the eggs of the parasite, which is not very pronounced in case of the dog tapeworm.

I am quite aware that the data adduced by me as to the discovery of the *Bilharzia hæmatobium* and *filaria sanguinis hominis* in my practice are not convincing as suggested by Dr. Stiles. I can only say that there is a kind of hæmaturia to be met with in southwest Texas and Mexico, which can not be explained by the idea of renal or vesicular disease, nor yet by malarial influences, and which looks much like the disease produced in Egypt by the *Bilharzia*. As stated in my previous paper I did not find the ova of the parasite in the urine, but am convinced that one with more time and skill than mine could do so. *Falaria sanguinis hominis* must necessarily exist where is found the disease caused by it, viz., *elephantiasis scroti aut nympharum*. That disease we have among the negroes and Mexicans not so very unfrequently (I have observed at least a dozen cases myself), and for this reason I conclude that the parasite will be found when properly hunted for.

I may be permitted to add to these remarks that in regard to *œstrus* I have not met *œstrus nasalis*, but the species (*œstrus lineatus*) which forms swellings under the skin of animals or man, and which is eliminated through a small aperture. I have some years ago removed such a larva from the leg of a woman, and my son has only a few days ago seen a somewhat similar case. He was consulted by a man whose child presented a doughy swelling on the thigh without discoloration of the skin, and without fluctuation. He gave him an ointment, and after a few days the swelling disappeared from the thigh and was seen in the neck. Bethinking himself of the pranks of needles that have been swallowed or gotten into the body by some other way, moving from one place to another in the body, my son told the boy to return to him in a day or two prepared to have the swelling laid open. The child returned in four days, but again the swelling had disappeared and reappeared upon the head over the

parietal bone. On squeezing it, my son dislodged a larva from a small black hole in the middle of the little tumor, followed by a small amount of bloody serum. After this the enlargement disappeared for good. The larva is about a quarter of an inch in length and about a line in thickness at the thickest part, is pellucid and shows a number of annular constrictions; apparently it is the larva of *hypoderma bovis vel hominis.* It is not probable that the wandering of this swelling can be due to the wandering of the larva, although it is well known that such wandering, but to a less extent than in this instance, is common with some of the larval parasites. It seems probable that each of the little tumors contained a larva which was expelled without the notice of the lad; so that each of the swellings was a separate and new product. Larva of flies are quite common in this district in all parts of the body of animals where there are bloody, suppurating, or even only offensive surfaces. In the nose, eyes, ears, wounds, chancres, *tinea capitis*, ulcerated gums, in fact in every part of the body to which flies have access, I have seen the maggots. I believe in a cavity like the nose, when once established, they propagate by parthenogenesis, without undergoing the change of a chrysalis or fly. One finds them from all sizes, and again from the egg to the mature maggot, even when by care all new access of a fly has been prevented.

MEMORIAL SERVICES.

Dr. Oliver, of Caldwell, chairman of this committee, being called on to take the chair, and not responding, Dr. Carhart was invited to preside in his stead, and on taking the chair said: "We find ourselves in an awkward position, owing to the absence of Dr. Oliver, chairman of the Committee on Necrology. We are not aware that he has been present during the session. This hour was designated as the hour for memorial services, and in consequence of the absence of Dr. Oliver we presume no arrangements have been made for its observance. We shall, therefore, be under the necessity of extemporizing exercises for the occasion. I trust, therefore, that any gentlemen present who may have had any acquaintance with the members of the association who have deceased during the year, whose names will be read by the secretary, will feel free, in fact are invited to speak with reference to their character and work, their relations to this association and the medical fraternity generally.

"I will simply say that several years ago, at a meeting of the association at Waco, at my suggestion, it was decided that an hour should be devoted to memorial services at each meeting of this association. Such memorial services had not been had regularly up to that time, and it seemed to Dr. Swearingen, Dr. Wooten, and myself and several others, that we were most decidedly remiss in this matter. There is no organization of respectability, whether social, literary, scientific, legislative or other body that does not notice in some form the death of one of its members; and it occurred to us that it was as becoming, and perhaps more so in some respects, that a body of physicians, with the character and dignity attaching to our profession, and the respect that is accorded the true physician everywhere, that we should pause in our deliberations for a short time each year, and men-

tion the names of our brothers, the honorable men who, having borne the "burden and heat of the day," having stood manfully on their posts battling with the ills of life and contending for the lives of their fellow-men, have themselves fallen at last under the hand of death.

"It is becoming that we should not only mention their honored names in this service, but that we should drop the sprig of Acacia, if no more, at the head of their graves, to testify our appreciation of their worth, and to speak of a future resurrection and of our faith in the immortality of the soul.

"In accordance with this idea we pause today in our deliberations, and we feel that it will be a benefit to our hearts and lives, and will strengthen our hands, possibly, and our purposes, as we go out of this meeeting of the association to face sickness and even death. It will inspire us to feel that our fellows of this association think of us, and that should we fall during the coming year, they will pause, at the end of another twelve months, and speak our names kindly and tenderly, and say some word of respect at our graves.

"I trust that we shall fully appreciate the solemnity of this occasion, and that we shall properly cherish the memory of the good and honorable men who have gone before us.

"Without detaining you further, the secretary will please give us the names of the deceased members, and then we shall be pleased to have any member of this association who has enjoyed acquaintance with the deceased members say a few words in commemoration of their characters. We trust that all the members will respectfully be seated. This is a solemn hour to us. It is Memorial Hour, and we wish to give it all that dignity and solemnity that the circumstances of the occasion suggest."

The secretary then read the names (as they appear in the minutes).

Appropriate remarks were made by Drs. York and West in commemoration of Dr. Cupples; by Dr. Bennett of Dr. James Kennedy; by Dr. Loggins of Dr. Witherspoon, of Corsicana; by Drs. Larendon and Rutherford of Dr. M. Perl, of Houston.

Committees were appointed to draft resolutions for publication in the transactions. The following only have reported:

Dr. P. C. Coleman, President State Medical Association—Your committee appointed to prepare resolutions on the death of Dr. George Cupples, have the honor to submit the following, feeling, however, that what we might say of him would still leave much unsaid due his true worth and noble character.

He was born in Berwick county, Scotland, October 13, 1836. His father, Robert Cupples, was a surgeon of sufficient merit to receive the appointment of surgeon in the Queen's royal navy, and maintained to his death a surgical and medical reputation freely conceded by all. His mother was Camilla Campbell, a native of England, and daughter of John Campbell, a Highlander, and captain in the royal navy.

Dr. George Cupples received an exceedingly liberal education in the best institutions of learning in his native country, and thoroughly prepared, he entered the University of Edinburgh and graduated from the medical department of that world renowned institution. In 1836 he went to Spain. There he procured a position in the Spanish service, and for two years was on the hospital staff. In 1839 he went to Paris to further perfect himself in his profession, and became an accomplished scholar in French literature. In 1843 he immigrated to Texas, and shortly after his arrival in this state located in San Antonio, where he resided until his death, April 19, 1895. He was married in Paris in 1843, to Miss Alexia Bourlora. She died in 1871, and he was again married in 1874 to Mrs. Laura Lagrave Shean. During the war with Mexico he was surgeon in the American army. In the late civil war he filled the position of medical director in the trans-Mississippi department of all cavalry in the service of the Confederate government. He was president of the Texas Medical Association in 1854, and again in 1878.

Whether occupying positions in times of peace or war, he was true to every trust imposed in him. Liberal in education, kind in heart, courteous in manner, ripe in judgment, he possessed the qualities to inspire confidence and win the affections of those associated with him or entrusted to his care. No one loved his profession more or worked harder to uphold the honor and dignity of medicine. He hated sham and quackery, and spent years of hard labor to have his adopted state enact laws that would place her in the front rank of medical advancement and medical civilization. His life was surely one to be praised, and the world is always poorer when such men as Dr. Cupples die; for history furnishes few examples of devotion so sincere, duty so faithfully discharged, and humanity more dearly loved. Therefore, be it

Resolved, That in the death of Dr. Cupples our association has lost

one of its first presidents, one of its most active workers, and one of its most honored members, and the profession a shining light and the world an honored man and good citizen. Be it further

Resolved, That these resolutions be spread upon the minutes of the association, and that a copy of them be sent to his bereaved family.

THOS. D. WOOTEN,
FERD. HERFF,
F. PASCHAL,
Committee.

DR. H. F. WITHERSPOON.

Dr. H. F. Witherspoon was born in Franklin county, Miss., June 6, 1834. After receiving a common school education he studied medicine and was graduated from Jefferson Medical College in Philadelphia in 1856, and from Castleton, Vermont, in 1857. He first located at Minden, La. From there he entered the service of the Confederacy as assistant surgeon in the Ninth Louisiana Regiment. After the surrender he located at Marshall, Texas, in fall of 1865. Thence in 1868 he moved to Chatfield, Navarro county, where he engaged in practice with his brother, Dr. A. N. Witherspoon, until 1875, when he removed to Corsicana, where, on the 7th of September, 1894, surrounded by admiring friends and loving relatives, he passed away. Through all his lingering illness (chronic hepatitis) he did never murmur nor complain, was always bright and cheerful and ever glad to see and converse with friends, and looked upon death as a relief from suffering and care. Dr. Witherspoon descended from honorable and cultured ancestry, and lacked none of those qualities which go to make up a true gentleman. Though plain and non-pretending in his nature, his mind was a storehouse of knowledge, both theoretical and practical, and occupied a sphere in his profession that should be emulated by those more ostentatious than he. He was ever kind and courteous to all the profession and especially to his younger brethren—one of those men for whom no code of ethics was ever written, he did unto others as he'd be done by. He supported all measures that tended to elevate medicine and medical men; was a member of his county medical society, and for a number of years had been a member of this association, and, although his voice was seldom heard and his face comparatively strange in the halls of this body, his heart was ever beating in unison with the more active workers in the cause. As a citizen he was honest, upright and a useful man, and in society no man was more respected. As a father he was kind

and loving, and as a husband devoted and true. He was loved and appreciated most by those who knew him best.

We recommend that this report be spread upon our minutes, and that a copy of same be sent to the family of our deceased and lamented brother.

J. A. McGEE,
T. A. MILLER,
Committee.

In Memoriam.

Dr. W. J. Burt, Austin, Texas, died July 10, 1886.
Dr. H. W. Moore, Fort Worth, Texas, died September 26, 1886.
Dr. G. K. McGregor, Waco, Texas, died May 12, 1884.
Dr. J. T. Meek, Ennis, Texas, died November 11, 1886.
Dr. James Haley, Moffatt, Texas, died February 20, 1887.
Dr. J. S. Willis, Waco, Texas, died July 6, 1887.
Dr. A. Welch, ———, died September 22, 1886.
Dr. J. T. Howe, Huntsville, Texas, died August 13, 1888.
Dr. Z. W. Baker, Temple, Texas, died December 13, 1888.
Dr. A. C. White Cuero, Texas, died December —, 1888.
Dr. F. A. Tompkins, Sandy Point, Texas, died July 26, 1888.
Dr. J. M. Ross, Brenham, Texas, died February 10, 1889.
Dr. Y. D. Harrington, Terrell, Texas, died June 9, 1889.
Dr. H. P. Downman.
Dr. J. L. Felder, Jr., Pittsburg, Texas.
Dr. W. H. Hardison, Fort Worth, Texas.
Dr. W. D. Kelley, Galveston, Texas.
Dr. Ed. Randall, Galveston, Texas, died November 13, 1889.
Dr. A. R. Kilpatrick, Navasota, Texas, died September 19, 1887.
Dr. Ashbel Smith, Cedar Bayou, Texas, died January 21, 1886.
Dr. S. F. Starley, Tyler, Texas, died December 19, 1887.
Dr. J. M. Lewis, Mexia, Texas.
Dr. S. T. Lowry, San Antonio, Texas, died June 30, 1890.
Dr. W. H. Park, Tyler, Texas, died November 4, 1885.
Dr. J. B. Robertson, Goliad, Texas.
Dr. W. L. Rogers, Galveston, Texas, died April —, 1887.
Dr. R. B. White, Ennis, Texas.
Dr. J. H. Martin, Dallas, Texas, died July 18, 1887.
Dr. E. J. Carothers, San Antonio, Texas.
Dr. A. E. Carothers, San Antonio, Texas.
Dr. G. W. Tucker, Comanche, Texas.
Dr. S. A. Towsey, Galveston, Texas.
Dr. Etien Mellou, Brownsville, Texas.
Dr. W. E. Saunders, Sherman, Texas.
Dr. Hilary Ryan.

Dr. W. A. East, Hallettsville, Texas, died December 5, 1885.
Dr. L. J. Cabell, Charlotteville, Va. [Honorary.]
Dr. Willis Westmoreland, Atlanta, Ga. [Honorary.]
Dr. J. H. T. King, Laredo, Texas.
Dr. S. H. Smith, Dallas, Texas.
Dr. A. A. Terhune, Jefferson, Texas.
Dr. L. J. Grayham, Henderson, Texas, died April 15, 1891.
Dr. F. T. Paine, Comanche, Texas, died April 16, 1891.
Dr. G. W. Kerr, Waelder, Texas, died April —, 1891.
Dr. T. S. Burke, Corpus Christi, Texas, died September 21, 1891.
Dr. W. T. Strain, Wills Point, Texas, died November 1, 1891.
Dr. W. W. Reeves, Austin, Texas, killed December 29, 1891.
Dr. T. M. Stone, Jasper, Texas, died January 18, 1892.
Dr. E. J. Ward, Waxahachie, Texas, died December 17, 1893.
Dr. E. G. Nicholson, Del Rio, Texas, died February 3, 1893.
Dr. M. S. Crow, Stephensville, Texas, died May 3, 1892.
Dr. C. C. Francis, Cleburne, Texas, died November 16, 1892.
Dr. A. W. Pope, Marshall, Texas, died November 3, 1892.
Dr. A. D. Burroughs, Houston, Texas.
Dr. J. E. Roach, Sipe Springs, Texas, died April 10, 1893.
Dr. C. F. Paine, Comanche, Texas, died September 13, 1893.
Dr. J. L. May, Stephensville, Texas.
Dr. M. H. Oliver, Ennis, Texas, died September 5, 1893.
Dr. John L. Wagley, Cleburne, Texas, died December 13, 1893.
Dr. H. W. Waters, Independence, Texas, June 4, 1894.
Dr. E. L. E. Castleton, Houston, Texas, died September 17, 1893.
Dr. Jas. Cowling, Houston, Texas, died June 23, 1894.
Dr. H. F. Witherspoon, Corsicana, Texas, died Sept. 7, 1894.
Dr. Michael Perl, Houston, Texas, died January 2, 1895.
Dr. Jas. Kennedy, Galveston, Texas, died March 27, 1895.
Dr. George Cupples, San Antonio, Texas, died April 19, 1895.
Dr. C. B. Raines, Mineral Wells, Texas, [Honorary] died June 28, 1895.
Dr. W. P. Burts, Fort Worth, Texas, died September 5, 1895.

The above list is all the secretary, unaided, has been able to prepare. Members in possession of facts regarding the death of any of the above, or of members not mentioned, date of death, nativity, when joined the association, etc., will confer a favor on the secretary by communicating with him, and will also render a service to the association.—[EDITOR.

LIST OF MEMBERS

OF

The Texas State Medical Association,

OF

AUXILIARY ASSOCIATIONS IN AFFILIATION,

AND OF

OFFICERS SINCE ORGANIZATION.

NEW MEMBERS.

Name.	Postoffice.	County.
Becton Jos. D	McKinney	Collin
Camp E. N	Lewisville	Denton
Cline I. M	Galveston	Galveston
Coble J. M	Dallas	Dallas
Cole W. F	Waco	McLennan
Davis E. P	Houston	Harris
Duncan Thos. G	Victoria	Victoria
Edmondson M. M	Dallas	Dallas
Florer Thos. W	Waxahachie	Ellis
Fry H. C	St. Jo	Montague
Gilbert R. S	Oak Cliff	Dallas
Hackler G. M	Ennis	Ellis
Hamilton J. W	Lampasas	Lampasas
Haynes F. E	Buffalo Gap	Taylor
Head G. C	Grandview	Johnson
Jackson T. T	Iredell	Bosque
Jones J. A	Ferris	Ellis
Lane W. J	Marshall	Harrison
Lee W. P	Cisco	Eastland
Lovett J. A	Abbott	Hill
McCrustion L. P	Paris	Lamar
Miller J. W	Hillsboro	Hill
Moore W. H	Weesatche	Goliad
Moore W. M	Paris	Lamar
Myers J	Honey Grove	Fannin
Naylor S. D	Stephenville	Erath
Neathery E. J	Van Alstyne	Grayson
Peyton F. T	Dallas	Dallas
Perkins A. T	Gatesville	Coryell
Powell R. G	Baird	Callahan
Shultz C. A	Alvarado	Johnson
Taylor T. W	Sherman	Grayson
Todd Frank C	Fort Worth	Tarrant
Walker R. R	Paris	Lamar
Wandless H. W	Dallas	Dallas
Young F. A	Navasota	Grimes

HONORARY MEMBERS.

Name.	Postoffice.	State.
Bozeman Nathan	New York	New York
Douglass Richard	Nashville	Tennessee
DuPre D	Dallas	Texas
Gray Landon Carter	New York	New York
Heard T. J	Galveston	Texas
Keller Jas. M	Hot Springs	Arkansas
Litten J. M	Austin	Texas
Love I. N	St. Louis	Missouri
Lydston Frank G	Chicago	Illinois
McGuire Hunter	Richmond	Virginia
McMurtry Louis S	Louisville	Kentucky
Meyer J. M	Danville	Kentucky
Milliken Sam'l E	New York	New York
Madden T. More	55 Merrion Square Dublin	Ireland
Noyes J. F	535 Broad Street Providence	Rhode Island
Osborn T. C	Cleburne	Texas
Price Joseph	Philadelphia	Pennsylvania
Reed R. Harvey	Mansfield	Ohio
Smith Albert H	Philadelphia	Pennsylvania
Souchon Edmund	New Orleans	Louisiana
Thompson W. G	49 E. Thirtieth St. New York	New York
Wyeth John A	New York	New York
Yandell David W	Louisville	Kentucky
Young S. O	Galveston	Texas

ORDINARY MEMBERS.

Name.	Postoffice.	County.	Elected.
Abney G. M	Franklin	Robertson	1893
Abney J. A	Lampasas	Lampasas	1893
Adams W. A	Fort Worth	Tarrant	
Akard G. W	Springtown	Parker	1890
Alexander C. M	Coleman	Coleman	1887
Alexander W. P	Cleburne	Johnson	1890
Archer W. A	Houston	Harris	1872
Armstrong V. P	Dallas	Dallas	1893
Ashton L	Dallas	Dallas	1892
Autrey J. L	Luna	Freestone	1893
Baldwin A. P	Tyler	Smith	1891
Barham J. H	Nacogdoches	Nacogdoches	1893
Barry C. C	Galveston	Galveston	
Bass T. B	Terrell	Kaufman	1892
Becton E. P	Austin	Travis	1876
Becton Jos. D	McKinney	Collin	1894
Bell T. J	Tyler	Smith	
Benbrook J. T	Rockwall	Rockwall	
Bennett Edward	San Antonio	Bexar	
Bennett T. J	Austin	Travis	1884
Berg L. M	Laredo	Webb	1890
Bever Wm. J	Creek	Houston	1893
Blailock W. R	McGregor	McLennan	1889
Blackburn J. H	Mineral Wells	Palo Pinto	1893
Blake D. B	Cuero	DeWitt	
Blewett W. J	Beaumont	Jefferson	1891
Blunt W. F	Galveston	Galveston	
Boatner J. W	Lewisville	Denton	1893
Bobo C. S	Boyd	Wise	1884
Boggs A. D	Marquez	Leon	1889
Bond Geo. D	Hillsboro	Hill	
Boyd F. D	San Antonio	Bexar	1893
Boyer S. S	Fort Worth	Tarrant	1893
Boyles J. T	Houston	Harris	
Bramlett A. C	San Antonio	Bexar	1892

NAME.	POSTOFFICE.	COUNTY.	ELECTED.
Braunagle Julius	San Antonio	Bexar	1889
Brittain B. F	Arlington	Callahan	
Brown A. P	Fort Worth	Tarrant	1876
Brown A. N	Richland	Navarro	1893
Brown J. E	McGregor	McClernan	
Brown W. E	Gatesville	Coryell	1890
Buie J	Hillsboro	Hill	1889
Bundy Z. T	Milford	Ellis	1890
Burleson J. H	Austin	Travis	
Burroughs J. J	Houston	Harris	
Burroughs S. R	Raymond	Leon	1876
Burch J. D	Aurora	Wise	1890
Callen W. P	Warren	Tyler	1892
Camp E. N	Lewisville	Denton	
Capps E. D	Fort Worth	Tarrant	1892
Carhart J. W	LaGrange	Fayette	1886
Carter J. L	Dallas	Dallas	
Carter J. T	Warrenton	Fayette	
Cerna D. T	Galveston	Galveston	1893
Chilton R. H	Dallas	Dallas	1881
Christian G. W	Houston	Harris	1886
Church B. F	Terrell	Kaufman	1889
Clark I. E	Shulenberg	Lavaca	1885
Clay C. L	Moody	McLennan	1886
Cline I. M	Galveston	Galveston	
Clopton A. G	Galveston	Galveston	1874
Coble J. M	Dallas	Dallas	
Cole W. F	Waco	McLennan	
Colby B. G	Claiborne		
Coleman P. C	Colorado City	Mitchell	1885
Collier E. S	Wills Point	Van Zandt	1892
Collins W. B	Lovelady	Houston	1893
Cooke H. P	Galveston	Galveston	1885
Cooper St. Cloud	Fort Smith	Arkansas	1890
Cravens M. H	Arlington	Tarrant	1892
Crump J. G	St. Jo	Montague	1885
Cunningham Sam	Elgin	Bastrop	1887
Cunningham W. M	Bastrop	Bastrop	1891
Daniel F. E	Austin	Travis	1882
Daniels J. G	Gilmer	Smith	1886

NAME.	POSTOFFICE.	COUNTY.	ELECTED.
Darr H. H	Caldwell	Burleson	1877
Davis E. P	Houston	Harris	
Davis J. A	Austin	Travis	1890
Dean J. F	Hornsby	Travis	1889
Denton A. N	Austin	Travis	
Ducie W. J	Galveston	Galveston	1893
Duke F. M	Alvin	Brazoria	1893
Duncan Thos. G	Victoria	Victoria	1894
Duringer W. A	Fort Worth	Tarrant	1887
Eads B. F	Marshall	Harrison	
Eagon S	Dallas	Dallas	
Edmondson M. M	Dallas	Dallas	1894
Emanuel M. T	Weatherford	Parker	
Evans W. T	Jewett	Leon	
Farrell A. J	Wharton	Wharton	1893
Fennell J. W	Seguin	Guadalupe	
Fennell J. D	Seguin	Guadalupe	1887
Ferris J. H	Henrietta	Clay	1886
Field J. T	Fort Worth	Tarrant	1872
Fisher F. K	Galveston	Galveston	1880
Fisher Wm. C	Galveston	Galveston	
Flavin Thomas	Galveston	Galveston	1893
Florer Thos. W	Waxahachie	Ellis	1894
Fly A. W	Galveston	Galveston	1877
Ford F. C	Nacogdoches	Nacogdoches	
Ford J. T	Decatur	Wise	1884
Foutz J. J	Gonzales	Gonzales	1891
Fowler B. A	Brownwood	Brown	1891
Fowler W. E	Bastrop	Bastrop	
Frazier J. M	Morgan	Bosque	
Frey J. H	Corsicana	Navarro	1890
Fry H. C	St. Jo	Montague	1894
Fry J. M	Wills Point	Van Zandt	
Fuller F. A	Jacksonville	Cherokee	
Gammon Wm	Galveston	Galveston	
Gardner A. B	Bellville	Austin	1880
Garwood A	New Braunfels	Comal	1887
Gary J. M	Galveston	Galveston	1893
Ghent H. C	Belton	Bell	1877

NAME.	POSTOFFICE.	COUNTY.	ELECTED.
Gilbert R. S	Oak Cliff	Dallas	1894
Gilcreest J. E	Gainesville	Cooke	1884
Gilsen F. J	Calvert	Robertson	1887
Grammar R. B	Fort Worth	Tarrant	1884
Grandbury H. B	Austin	Travis	1893
Gray A. J	Wills Point	Van Zandt	1887
Gwin C. L	Galveston	Galveston	1880
Hackler G. M.	Ennis	Ellis	1894
Haden Jno. B	Galveston	Galveston	1893
Hadra B. E	San Antonio	Bexar	1873
Hale J. W	Waco	McLennan	1893
Hall Geo. P	Galveston	Galveston	
Hamilton J. W	Lampasas	Lampasas	1894
Harris D	Whitney	Hill	1889
Harrison R. H., Jr	Columbus	Colorado	
Haughton R. E	Midland	Midland	1891
Haynes F. E	Buffalo Gap	Taylor	1894
Head G. C	Grandview	Johnson	1894
Hendricks J. P	Houston	Harris	1893
Herff Adolph	San Antonio	Bexar	
Herff Ferdinand	San Antonio	Bexar	
Hicks F. M	San Antonio	Bexar	
Hilgartner H. L	Austin	Travis	1892
Hill H. B	Austin	Travis	1893
Hill L. D	Webberville	Travis	1893
Hodges R. C	Houston	Harris	1888
Hons J. M	San Marcus	Hays	1893
Hubbard M	Roseland	Collin	1893
Hudson C. P	Alvarado	Johnson	1886
Hudson J. W	Milano	Milam	1891
Hudson S. E	Austin	Travis	1893
Hughes C. T	Meridian	Bosque	1893
Hunter J. W	Waco	McLennan	
Inge J. M	Denton	Denton	1885
Jackson T. T	Iredell	Bosque	1894
Jarrett J. C	Valley Mills	Bosque	1891
Jones J. A	Ferris	Ellis	1894
Jones Jno. C	Gonzales	Gonzales	1878
Jones L. L	Forney	Kauffman	1891
Johnson Clay	Corsicana	Navarro	1892
Jones E. A	Osage	Coryell	1893
Knox R. W	Houston	Harris	1885

NAME.	POSTOFFICE.	COUNTY.	ELECTED.
Karnes T. C	Gonzales	Gonzales	1890
Keiller Wm	Galveston	Galveston	1893
Kemp Jos	Thorp Springs	Bosque	1891
Kendall O. J	Wichita Falls	Wichita	1886
Kennedy N. B	Hillsborough	Hill	1890
Kimmins R. L	Iredell	Bosque	1890
King S. F	Sherman	Grayson	
King F. B	Houston	Harris	1893
King J. C J	Waco	McLennan	1878
Kingsley B. F	San Antonio	Bexar	1886
Kirkpatrick D. F	Waketon	Denton	
Kirkpatrick S. B	Commerce	Hunt	1884
Knox M. D	Hillsboro	Hill	
Knox R. T	Gonzales	Gonzales	
Knox T. R	Hallettsville	Lavaca	
Lancaster W. H	Moulton	Lavaca	
Landegren J	Shafter	Presidio	1880
Lane W. J	Marshall	Harrison	1894
Lankford J. S	San Antonio	Bexar	
Larendon G. W	Houston	Harris	1891
Larendon J	Houston	Harris	1869
Largent J. W	McKinney	Collin	1893
Leake H. K	Dallas	Dallas	
Ledbetter A. A	Hallettsville	Lavaca	1887
Lee Geo. H	Galveston	Galveston	1888
Lee W. P	Cisco	Eastland	1894
Le Grand C. W	Hempstead	Waller	1877
Letcher J. S	Dallas	Dallas	
Link E. W	Palestine	Anderson	1889
Litten Frank	Austin	Travis	1889
Loggins J. C	Ennis	Ellis	1882
Lovett J. A	Abbott	Hill	1894
Lutrell J. M	Mineral Wells	Palo Pinto	1893
Lynch M. C	Carroll's Prairie	Hopkins	1892
Martin F. R	Kyle	Hays	1884
Matthews W. J	Austin	Travis	1891
Matthews C. O	Terrell	Kaufman	1892
Maxwell T. O	Austin	Travis	
Mayes C. M	Archer	Archer	1890
McAlpine W. A	Galveston	Galveston	1893
McCaleb G. W	Gonzales	Gonzales	1893
McCaleb J. H	Webberville	Travis	

NAME.	POSTOFFICE.	COUNTY.	ELECTED.
McCall R. A	Ennis	Ellis	1886
McCrustion L. P	Paris	Lamar	
McDaniel A. S	San Antonio	Bexar	
McDaniel J. H	Centerville	Leon	1890
McGee I. A	Rice	Navarro	1882
McKnight W. B	Springtown	Parker	1889
McKenzie E. K	Tyler	Smith	1892
McLaughlin F. P	Austin	Travis	
McLaughlin J. W	Austin	Travis	1875
McReynolds Jno. E	Galveston	Galveston	
Means W. P	Mexia	Limestone	1891
Menefee A. J	Rio Vista	Johnson	1893
Menefee E. L	Granbury	Hood	1886
Mewland W. B	Gatesville	Coryell	
Miller, J. E	Lockhart	Caldwell	
Miller T. A	Corsicana	Navarro	1891
Miller J. W	Hillsboro	Hill	
Montgomery A. L	Tyler	Smith	1888
Montgomery D. W	Concord	Leon	1891
Monday W. H	Terrell	Kaufman	1892
Moody R. E	Sweetwater	Nolan	1890
Moore W. H	Weesatche	Goliad	
Moore W. M	Paris	Lamar	
Morris J. E	Madisonville	Madison	
Morris Jas. E., Jr	Madisonville	Madison	1891
Morris Seth M	Galveston	Galveston	
Moss R. E	San Antonio	Bexar	1884
Motley John G	Overton	Rusk	1892
Myers J	Honey Grove	Fannin	
Naylor S. D	Stephenville	Erath	1894
Neathery E. J	Van Alstyne	Grayson	1894
Nettles R. C	Marlin	Falls	1877
Noster C. H	New Braunfels	Comal	1893
Oates D. T. F	Mexia	Limestone	1890
O'Barr J. T	Ledbetter	Washington	1890
O'Hara Jas. H	Grandview	Johnson	1887
Olive N. A	Waco	McLennan	1887
Oliver J. P	Caldwell	Burleson	1874
Orr C. L	Kenedy	Karnes	1890
Osborn J. D	Cleburne	Johnson	1882
Paine J. F. Y	Galveston	Galveston	1877
Parker G. D	Houston	Harris	1893

NAME.	POSTOFFICE.	COUNTY.	ELECTED.
Parker Daniel	Calvert	Robertson	1887
Paschall Frank	San Antonio	Bexar	
Patterson G. M. D	Franklin	Robertson	1889
Perkins A. N	Sabine Pass	Jefferson	
Perkins A. T	Gatesville	Coryell	
Peyton F. T	Dallas	Dallas	
Pope Irvin	Tyler	Smith	1888
Pope Jno. H	Marshall	Harrison	
Pope R. J	Jonesboro	Coryell	1891
Powell R. G	Baird	Callahan	1894
Powell W. M	Albany	Shackelford	
Powell W. P	Willis	Montgomery	
Powell J. H. E	Smithville	Bastrop	1893
Poynor R. S	Bartlett	Williamson	1891
Preston John	Austin	Travis	1887
Price J. Sam'l	Beaumont	Jefferson	1893
Rabb E. M	Hallettsville	Lavaca	1887
Raines C. B., Jr	Mineral Wells	Palo Pinto	
Randall Edward, Jr	Galveston	Galveston	
Ray D. M	Whitewright	Grayson	1882
Red S. C	Houston	Harris	1893
Reuss J. H	Cuero	DeWitt	
Richardson D. P	Henderson	Rusk	1892
Richmond W. T	Manor	Travis	1891
Rogers W. L	Temple	Bell	
Rosser C. M	Terrell	Kaufman	1886
Rutherford R	Houston	Harris	
Rice S. P	Marlin	Falls	
Sampson A. F	Galveston	Galveston	
Saunders B	Fort Worth	Tarrant	
Schenk A. H	Kenney	Austin	1893
Schmidt F. A	LaGrange	Fayette	1889
Scott A. C	Temple	Bell	
Scott M. M	Brownwood	Brown	1891
Scott J. W	Houston	Harris	1893
Seale W. H	Marquez	Leon	1891
Sears J. H	Waco	McLennan	1869
Sessions E. L	Hillsboro	Hill	
Shearer T.W	Wallisville	Chambers	1893
Shirley D. G	Tyler	Smith	1892
Sholars S. W	Orange	Orange	1889
Shropshire L. L	San Antonio	Bexar	1885

NAME.	POSTOFFICE.	COUNTY.	ELECTED.
Saunders J	Orange	Orange	
Shropshire W	Houston	Harris	1893
Shultz, C. A	Alvarado	Johnson	1894
Sims R. S	Iowa Park	Wichita	1891
Smith A. J	Galveston	Galveston	1893
Smith B. D	St. Elmo	Travis	1893
Smith C. A	Tyler	Smith	1889
Smith M. M	Austin	Travis	
Smith Q. C	Austin	Travis	1884
Snead A. H	Waco	McLennan	
Snyder E. W	Benbrook	Tarrant	1890
Sparkman A. T	Alvord	Wise	1890
Sproule R. M	Liberty	Liberty	
Stallcup J. H	Jefferson	Marion	
Starley W. F	Tyler	Smith	
Strayhorn J. M	Bartlett	Williamson	1893
Stuart D. F	Houston	Harris	1869
Stuart Jas. R	Houston	Harris	1893
Suttle J. N	Corsicana	Navarro	1891
Swearingen R. M	Austin	Travis	1876
Swindall F. W	Tyler	Smith	1892
Sykes G. S	Galveston	Galveston	
Tate H. L	Lindale	Smith	1892
Taylor T. W	Sherman	Grayson	1894
Terrell W. N	Farmer	Young	1886
Thomas G. T	Rogers	Bell	1891
Thomas J. E	Mexia	Limestone	1886
Thomason J. W	Huntsville	Walker	1887
Thompsom F. D	Fort Worth	Tarrant	
Thompson Jas. E	Galveston	Galveston	1893
Thorpe H. H	Liberty Hill	Williamson	1884
Todd Frank C	Fort Worth	Tarrant	1894
Townes J. M	Joshua	Johnson	1890
Trueheart C. W	Galveston	Galveston	
Tucker F. H	San Augustine	San Augustine	1886
Tucker J. P	Ben Wheeler	Van Zandt	1888
Tye R. P	Chickasha	Indian Ter	1890
Tyner T. J	Austin	Travis	1893
Van Gasken J	Luling	Caldwell	1889
Vaughan B. H	Hillsboro	Hill	1890
Walker R. R	Paris	Lamar	
Walker W. W	Schulenberg	Fayette	1878

NAME.	POSTOFFICE.	COUNTY.	ELECTED.
Wagley T. J	Cleburne	Johnson	
Walker A. C	Rockdale	Milam	
Walker R. R	Paris	Lamar	1894
Wall J. E	Carthage	Panola	1893
Wallace D. R	Waco	McLennan	1869
Wandless H. W	Dallas	Dallas	1894
Warfield C	Galveston	Galveston	1893
Watkins W. A	Kemp	Kaufman	1891
Watkins W. B	Stone Point	Van Zandt	1886
Watkins W. B. W	Eureka	Navarro	1890
Weathered A. J	Waco	McLennan	1890
Weller C. O	Austin	Travis	1887
West H. A	Galveston	Galveston	1887
White F. S	Fort Worth	Tarrant	1886
White W. P	Henderson	Rusk	1892
Wickline R. M	Johnson City	Blanco	1893
Wier R. R	Itasca	Hill	1886
Wilkinson C. H	Galveston	Galveston	
Williams, J. O	Wm. Penn	Washington	1893
Williams O. L	Oak Cliff	Dallas	
Williamson J. J	Cleburne	Johnson	
Williamson J. R	Brenham	Washington	1885
Williamson R. A	Hillsboro	Hill	1887
Wilson J. T	Sherman	Grayson	
Wolff A. S	Brownsville	Cameron	1888
Wooten T. D	Austin	Travis	
Worsham B. M	Austin	Travis	1890
Yater W. M	Cleburne	Johnson	1887
York W. L	Decatur	Wise	1882
Young F. A	Navasota	Grimes	1894

AUXILIARY ASSOCIATIONS IN AFFILIATION.

Austin District Medical Society.
Bell County Medical Society.
Bosque County Medical Association.
Brownsville and Matamoras Medical Association.
Central Texas Medical Association (Waco).
Collin County Medical Society.
Dallas County Medical Association.
Ellis County Medical Association.
East Line Medical Association.
Fayette County Medical Association.
Fort Worth and Tarrant County Medical Association.
Galveston County Medical Association.
Grayson County Medical Association.
Hill County Medical Association.
Johnson County Medical Association.
Kauffman County Medical Association.
Leon County Medical Association.
Llano County Medical Society.
Long Medical Association (Bastrop County).
North Texas Medical Association.
Rockwall and S. E. Collin County Medical Association.
San Antonio Medical and Surgical Society.
Smith County Medical Society.
Travis County Medical Association.
Terrell Medical Association.
Val Verde Medical Society.
Washington County Medical Association.
Waco Medical Association.
Western Texas Medical Association (San Antonio).

OFFICERS OF THE TEXAS STATE MEDICAL
HOUSTON, TEXAS,

Session	Date of Meeting	Place of Meeting	Presidents	First Vice Presidents
1	June, 1869	Houston	T. J. Heard	R. H. Jones
2	June, 1870	Houston	R. H. Jones	R. W. Lindsay
3	June, 1871	Houston	D. R. Wallace	L. Hudspeth
4	June, 1872	Houston	R. T. Flewellen	J. A. McQueen
5	April, 873	Waco	D. F. Stuart	H. W. Brown
6	April, 1874	Dallas	A. G. Clopton	T. D. Wooten
7	April, 1875	Austin	H. W. Brown	L. R. Mayfield
8	April, 1876	Marshall	R. H. Harrison	John H. Pope
9	April, 1877	Galveston	W. D. Kelley	Geo. Cupples
10	April, 1878	San Antonio	Geo. Cupples	R. W. White
11	April, 1879	Sherman	John H. Pope	S. F. Matchett
12	April, 1880	Brenham	A. R. Kilpatrick	R. M. Swearingen
13	April, 1881	Waco	Ashbel Smith	S. F. Starley
14	April, 1882	Fort Worth	S. F. Starley	W. P. Burts
15	April, 1883	Tyler	A. P. Brown	T. H. Nott
16	April, 1884	Belton	H. C. Ghent	E. P. Becton
17	April, 1885	Houston	E. P. Becton	R. Rutherford
18	April, 1886	Dallas	T. H. Nott	R. H. Chilton
19	April, 1887	Austin	S. R. Burroughs	R. T. Knox
20	April, 1888	Galveston	J. F. Y. Paine	H. K. Leake
21	April, 1889	San Antonio	R. M. Swearingen	A. Sims
22	April, 1890	Fort Worth	W. P. Burts	J. C. J. King
23	April, 1891	Waco	W. H. Wilkes	P. C. Coleman
24	April, 1892	Tyler	J. D. Osborn	T. J. Bell
25	May, 1893	Galveston	J. H. Sears	C. M. Rosser
26	April, 1894	Austin	J. W. McLaughlin	W. L. York
27	April, 1895	Dallas	P. C. Coleman	J. T. Wagley

* Died July, 1886, and F. E. Daniel was appointed till next meeting.

ASSOCIATION SINCE ITS ORGANIZATION AT JUNE 16, 1869.

Second Vice Presidents	Third Vice Presidents	Secretaries	Treasurers
D. R. Wallace	.....	A. Connell	F. Hassenberg
W. J. Locke	.....	A. Connell	W. P. Riddell
J. T. Norris	.....	A. Connell	W. P. Riddell
D. F. Stuart	.....	A. Connell	J. Larendon
J. M. Morrison	.....	S. O. Young	J. Larendon
M. H. Oliver	.....	W. A. East	J. Larendon
M. A. Taylor	R. H. Harrison	W. A. East	J. Larendon
T. W. Wiley	W. H. Park	W. A. East	J. Larendon
R. M. Swearingen	J. H. Sears	W. A. East	J. Larendon
W. E. Saunders	J. T. Field	W. A. East	J. Larendon
S. F. Starley	S. Eagan	W. A. East	J. Larendon
E. J. Beall	O. H. Seeds	R. H. L. Bibb	J. Larendon
J. W. McLaughlin	J. A. Summers	R. H. L. Bibb	J. Larendon
W. A. Adams	Joe S. Willis	W. J. Burt	J. Larendon
J. D. Osborn	Frank Allen	W. J. Burt	J. Larendon
H. H. Darr	M. Matkin	W. J. Burt	J. Larendon
John C. Jones	S. R. Burroughs	W. J. Burt	J. Larendon
J. C. Loggins	H. L. Parsons	W. J. Burt*	J. Larendon
A. M. Douglass	A. A. Terhune	F. E. Daniel	J. Larendon
A. V. Doak	O. Eastland	F. E. Daniel	J. Larendon
B. F. Kingsley	I. E. Clarke	F. E. Daniel	J. Larendon
M. D. Knox	W. W. Reeves	F. E. Daniel	J. Larendon
W. L. Rogers	B. H. Vaughan	H. A. West	J. Larendon
F. W. Pitts, Jr	T. J. Bennett	H. A. West	J. Larendon
E. M. Rabb	W. A. Watkins	H. A. West	J. Larendon
W. R. Blailock	W. H. Lancaster	H. A. West	J. Larendon
N. B. Kennedy	T. B. Bass	H. A. West	J. Larendon